WHY & HOW to sharpen squeegees

THE SQUEEGEE
- AN ESSENTIAL TOOL OF THE TRADE -
overlooked & misunderstood:

« Screen-printing companies must make a choice. Ignore the squeegee and suffer the consequences or learn as much as possible about the purpose and use of the squeegee, then profit from their knowledge. »

Tamas Frescka / Screen Printing Magazine
June 2003
**THE SQUEEGEE**

**Selection Criteria**
- Durometer
- Composition
- Edge Profile
- Edge Condition
- Blade Width
- Blade Thickness
- Free Height
- Chemical Resistance
- Abrasion Resistance
- Cost

**On Press Criteria**
- Blade Angle
- Blade Parallelism
- Blade Skew
- Length to Screen
- Length to Image
- Orientation to Image
- Blade Pressure
- Stroke Speed
- Mesh Deflection
- Rotation

**Maintenance Criteria**
- Store Blades Flat
- Sharpen Before First Use
- Keep Clean and Dry
- Keep Free of Chemicals
- Never Soak Blade
- Rotate Often
- Replace Before Failure
- Check Durometer Often
- Discard When 5° Shift Occurs
- Inspect Before Use

**Sharpening Criteria**
- Allow Rest of 6-12 hrs
- Sharpen After Rest
- Camber Long Squeegees
- Make Parallel to Holder
- Sharpen in Small Increments
- Produce Clean, Smooth Edge
- Use Diamond Grinding Wheels
- Begin with 60 Grit
- Finish with 360 Grit
- Discard After Removing 12.5%

**Storage**
- Cut to Size - Store Flat
- Remove Ink Immediately
- Store at 20-25°C / 68-77°F
- Store in Dry Area
- Shelf Life is 2 years Unused
- Keep Away From Sunlight
- Store With Blade Up
- Should Not Touch Anything

Copyright Bill Hood - 2013
JUST HOW IMPORTANT IS THE SQUEEGEE?

The squeegee is one of the most important tools used in screen printing. It is a unique and integral part of the process. Through the variables of angle, pressure and speed the squeegee controls the correct amount of ink required to fill the screen fabric. Too little ink will prevent transfer, too much will cause smearing. This, in turn, controls ink deposit and affects the color; squeegee edge quality will determine sharpness of the printed image.

Unfortunately, all too often, most screen printers produce tens of thousands of impressions without ever bothering to evaluate the squeegee because it “seems to work,” no matter what its actual condition is. Unless the blade has an obvious flaw (like a «nick» which leaves a streak in the image), production seems to go on forever. When streaks or other problems do occur, the blade simply gets replaced and production continues.

There are two things wrong with this picture of the squeegee:

1. Just because a squeegee prints with no major visual flaws, doesn’t mean that the image has not changed between the first and last impression (print). This quality difference may be acceptable to the printer, but not to a customer looking for uniformity from print to print. Furthermore, some image flaws (often mistaken as symptoms of mechanical problems) may actually be related to the squeegee blade and not the printing equipment.

2. Replacing a squeegee blade is anywhere from 5 to 50 times more expensive than repairing it by sharpening it. Throwing away a squeegee after 50,000 impressions is not only environmentally wasteful, but it is not very cost effective.
THE FUNCTION OF THE SQUEEGEE

Although it looks simple, the squeegee is a highly complicated part of the printing process. Unlike the ink-related press parts in other printing processes (doctor blades, ink rollers, pressure rollers, pads etc.), the squeegee alone must perform the following functions:

- Filling the screen mesh with ink
- Wiping with a soft round squeegee
- Keeping the mesh in contact with the substrate
- Adapting the mesh to the shape of the substrate
- Removing the excess ink from the surface of the screen mesh
- Wiping with a hard sharp squeegee
- Filling with a soft round squeegee
- Filling with a hard sharp squeegee

The above figure provides a diagram of the standard squeegee. While all the components are important, we need only consider four main features.

1. Durometer
2. Free-height
3. Blade profile
4. Blade edge

The squeegee must do each of these jobs well to make a good print. Yet, every time the squeegee’s shape and size vary, it affects all four of these printing functions.
THE FUNCTION OF THE SQUEEGEE

1 DUROMETER

Durometer represents the hardness and resilience of the squeegee material (most commonly made of polyurethane due to its superior chemical and abrasion resistance) as opposed to Modulus, which represents blade flexibility.

The durometer, together with the chemical formulation, the physical size and shape of the blade determines its bending, flexing, and compression characteristics. It controls print angle, affects print speed, ink deposit and surface adaptability.

Durometer readings represent a numerical value of compression, generally ranging from 55 to 90 ShA. Measured by a Shore A Testing Device, there are 3 basic categories for squeegee durometer:

**GENERAL RULE:**
Lower hardness: More ink deposit
Higher hardness: Less ink deposit

### Typical Use:
- **40-55 durometer:** Direct ceramic or tile printing
- **65 or 70 durometer:** Textile printing (lines)
- **75 durometer:** UV and solvent-based inks; also some textile inks for fine line or 4-Color Process work
- **85 durometer or above:** UV inks only

Commonly, harder squeegees offer better performances (resistance, precision) than softer squeegees except when:
- Adapting to irregular substrates
- Printing thick ink layers.

2 FREE-HEIGHT

This is the unsupported part of the blade that protrudes from the squeegee holder, which determines how much the blade will bend under pressure.

When a squeegee blade bends, the printing angle between the blade and screen changes and the amount of printing force transmitted to the substrate is reduced. You can think of the blade as a series of springs. When they are aligned with a force they transmit all the force. When the force is at an angle, the spring starts to bend and transmits less and less force.

At a certain point, when the printing angle is reduced and insufficient printing pressure is applied, the squeegee can’t work properly. It will adapt to the substrate poorly and it will remove less ink from the screen. The end result will be a thicker ink deposit. At this point most printers start to apply more pressure to the squeegee which will result in even more bending and totally unpredictable ink-deposit thickness.
THE FUNCTION OF THE SQUEEGEE

3 BLADE PROFILE

This refers to the shape at the print edge, affecting ink deposit and adaptability. Although the most frequently used shape is a simple rectangle, other shapes are also used for certain printing conditions.

The three basic profiles available to printers are the rectangle (or straight edge), various beveled shapes, and the round (bull-nose) shape.

The rectangular shape provides medium adaptability, maximum printing pressure, and a printing angle that is close to the angle setting of the holder. It is the most commonly used profile because it is adaptable to the widest range of surfaces and screen-printing applications; suitable for use with equipment with adjustable angle settings.

Beveled Edge (or “V” shape) profile - Provides maximum adaptability for printing on irregular surfaces without affecting the rest of the blade; Frequently utilized where no adjustment to press angle is possible, it provides reduced printing pressure and a printing angle that is less than the set angle. This profile most commonly used for container printing and for 3-D (three dimensional) objects.

Round (or Bullnose) Profile - The round profile provides the least surface adaptability of all profiles; minimum printing pressure and a printing angle that is independent of the angle setting on the press. It is always at a minimum. For these reasons, it deposits the most ink (particularly in textile printing), but at the same time provides the least detail of all the profiles.

The following chart explains the selection of various profiles and durometers.

<table>
<thead>
<tr>
<th>BLADE PROFILE</th>
<th>FORCE, MESH-OPENING, VISCOSITY</th>
<th>OFF-CONTACT SCREEN TENSION</th>
<th>ADAPTATION TO SUBSTRATE SURFACE</th>
<th>INK-LAYER THICKNESS, IMAGE DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEDIUM DUROMETER</td>
<td>Highest printing force available; use on any mesh with high viscosity inks</td>
<td>Use on high tension screens with low off-contact</td>
<td>Very poor adaptation; use on uneven, smooth surfaces</td>
<td>Good thickness control and definition on smooth even substrates</td>
</tr>
<tr>
<td>MEDIUM DUROMETER</td>
<td>Highest printing force available; use on any mesh with high viscosity inks</td>
<td>Use on high tension screens with low off-contact</td>
<td>Very poor adaptation; use only on smooth, well-set-up presses</td>
<td>Good thickness control and definition on smooth even substrates</td>
</tr>
<tr>
<td>MEDIUM DUROMETER</td>
<td>Highest printing force available; use on any mesh with high viscosity inks</td>
<td>Use on high tension screens with low off-contact</td>
<td>Good adaptation; useful for most uneven surfaces</td>
<td>Excellent thickness control and definition on most surfaces</td>
</tr>
<tr>
<td>SOFT DUROMETER</td>
<td>Medium force, use with large mesh openings and low viscosity inks</td>
<td>Use with low tension screens or screens with minimum off-contact</td>
<td>Use on rough or uneven surfaces, dented press beds and poorly set up presses</td>
<td>Poor thickness control and image definition; use for coating applications</td>
</tr>
<tr>
<td>SOFT DUROMETER</td>
<td>Medium force, use with large mesh openings and low viscosity inks</td>
<td>Use with low tension screens or screens with minimum off-contact</td>
<td>Use on uneven contoured surfaces (containers, etc.)</td>
<td>Mediocre thickness control and image definition</td>
</tr>
<tr>
<td>SOFT DUROMETER</td>
<td>Medium force, use with large mesh openings and low viscosity inks</td>
<td>Use with low tension screens or screens with minimum off-contact</td>
<td>Use on rough or uneven surfaces soft absorbent materials, worn presses</td>
<td>Poor thickness control and image definition; use for coating applications</td>
</tr>
<tr>
<td>SOFT DUROMETER</td>
<td>Medium force, use with large mesh openings and low viscosity inks</td>
<td>Use with low tension screens or screens with minimum off-contact</td>
<td>Use on rough or uneven surfaces, dented press beds and poorly set up presses</td>
<td>Poor thickness control and image definition; use for coating applications</td>
</tr>
</tbody>
</table>

The rectangular shape provides medium adaptability, maximum printing pressure, and a printing angle that is close to the angle setting of the holder. It is the most commonly used profile because it is adaptable to the widest range of surfaces and screen-printing applications; suitable for use with equipment with adjustable angle settings.

Beveled Edge (or “V” shape) profile - Provides maximum adaptability for printing on irregular surfaces without affecting the rest of the blade; Frequently utilized where no adjustment to press angle is possible, it provides reduced printing pressure and a printing angle that is less than the set angle. This profile most commonly used for container printing and for 3-D (three dimensional) objects.

Round (or Bullnose) Profile - The round profile provides the least surface adaptability of all profiles; minimum printing pressure and a printing angle that is independent of the angle setting on the press. It is always at a minimum. For these reasons, it deposits the most ink (particularly in textile printing), but at the same time provides the least detail of all the profiles.
THE FUNCTION OF THE SQUEEGEE

In recent years, squeegee manufacturers have developed a variety of multi-durometer squeegee blades

Multi-durometer combinations:

- Less bending under pressure (typical with automatic textile presses).
- Less wear: longer life.
- Less dot gain over time.
- Recommended for fine line and 4 color process printing
- Recommended for faster print equipment.

An important advantage of a multi-durometer squeegee over a single durometer blade is that over time, a single durometer blade of equal “side shore value” will bend more than a multi. The bending of the squeegee under pressure forces more surface area of the squeegee closer to the surface of the mesh, reducing the optimum printing angle and preventing a clean “snap-off”. While this may not appear as critical in the first prints, it will be noticeable to printers on longer runs, leading to loss of detail or dot gain issues when printing halftones. A multi-durometer squeegee resists “roll-over” during printing. Less pressure is required, resulting in less wear to the print edge and increased squeegee life and performance.

BLADE EDGE

This feature is the “working end” of the blade and it is the part that actually fulfills all four functions of the squeegee. The sharpness of this edge is the primary control of ink-deposit. A sharp edge will provide the minimum amount of ink and the maximum image definition. As the edge dulls and rounds, the ink deposit will increase. Eventually, this increase will adversely affect both color and image definition.

When printing large, simple designs with opaque inks, this change in color and image definition may not be visually apparent. However, when printing fine-lines, four-color process, or when using semi-opaque (UV) and transparent inks, you will quickly see the deterioration of the squeegee edge. Just compare the first and last prints of a long run where the squeegee was not sharpened during production.
WHY SHARPEN SQUEEGEES

Now that you know what the squeegee is supposed to do, let's examine what prevents it from doing its job properly. When you insert a new piece of squeegee blade into a holder and clamp down with screws or clamping bars, you might assume the squeegee is press ready. Unfortunately, the answer is almost always “NO.”

In more than 90% of all existing squeegee holders, the blade becomes distorted because of uneven placement in the holder or because screw tension causes the blade to buckle. Few, if any, press operators can insert the blade and adjust the screws consistently. As a result, new blades are frequently the most uneven.

This random pressure creates high and low spots along the blade that will distort the effective angle and pressure of the squeegee. Consequently, the only way to overcome this irregularity when printing is by applying additional force to the blade. Not only does this extra squeegee pressure cause unnecessary wear and tear on people and equipment (including the squeegee), the result is an unpredictable, uneven ink deposit, sometimes creating dramatic color variations across the image area relative to these high and low spots. To correct this problem, a new squeegee blade should be sharpened as soon as it is inserted into the holder.

Even assuming a perfectly inserted blade, once it has gone to press and even though you may not see it, the squeegee’s printing edge begins to wear from the very first impression. This wear is gradual and initially, it may actually improve the performance of the squeegee. (Minute imperfections on the edge become polished to a semi-gloss state which is ideal for uniform ink distribution.) Depending on material type and durometer of the blade, however, the wear on the edge will eventually create the following conditions:

1. The edge will become rounded, leaving a progressively heavier ink deposit
2. The edge may become so highly polished it will tend to skip over the ink rather than spread it. This happens primarily with poster, water-based, or plastisol inks.
3. The edge may become swollen (because of solvent absorption) and small pieces of material will actually break off, leaving streaks in the image. This happens with highly aggressive inks (e.g., vinyl, polyester, and UV).
4. Excess wear along the edge will occur at some spots because of image design/placement and press limitations. For example, this image shows a print with reverse lettering in a large printed area. If this job was done on a cylinder press, the blade might also wear at the grippers and create subsequent streaks.

Once the edge begins to deteriorate, it will only get worse. In some cases, you will notice streaks and light/dark areas in the image. In other cases, the color difference
WHY SHARPEN SQUEEGEES

is not easy to see, but the reduced sharpness of the image and tiny skip marks resembling “fisheyes” tell you there is a problem. Unfortunately, printers often assume these flaws indicate a problem with the machine or the ink. The all too frequent solution is to adjust squeegee pressure, angle, and even change the ink, before someone finally examines the squeegee. In the mean time, the image gets worse and productivity suffers while operators try to cope with the problem.

The simple solution to all these problems is to sharpen and maintain the squeegee throughout its useful life. Except for the initial sharpening of a new squeegee, maintaining a sharp edge depends on the blade quality and the number of impressions made before you notice a change in image quality. There are no «rules» for how often a squeegee should be sharpened. In general, it is unlikely that a squeegee can perform at all past 50,000 impressions and for quality printing, a squeegee should be evaluated at least every 5,000 impressions.

THE DOLLARS AND SENSE OF SHARPENING

Sharpening squeegees can benefit your business in three ways:

1. Sharpening improves print quality and increases customer satisfaction and sales.
2. Sharpening reduces your production costs by eliminating wasted materials and down time due to poor squeegee performance and extra press setups.
3. Sharpening reduces squeegee-blade and ink-consumption, providing direct savings.

Though it is difficult to calculate the actual dollar value of the first two benefits, they are as significant as any direct savings you can achieve. Therefore, when you try to justify the cost of a squeegee sharpener, you must remember that your actual savings may be 50%-100% higher than savings related directly to squeegee blade and ink consumption.

A serilor® sharpener will allow you to sharpen a new squeegee 25-50 times during its useful life. That’s like getting 25-50 new squeegees for the price of one. Since the useful life of a squeegee is between a year to a year and a half, let’s evaluate what you will save on a 12 to 18 month supply of blades (after which you should be replacing them anyway).

For example, if we use an average cost (of $1.40/inch) for a new 36” squeegee blade, the cost of that blade (36” x $1.40 inch) is $50.40. Your potential savings by sharpening rather than replacing that one 36” blade will range from $1,260 (over a 12 month period) to up to $2,520 (over an 18 month period). This would amount to a 94-98% savings on blade material alone.
THE DOLLARS AND SENSE OF SHARPENING

How many times can you sharpen a squeegee?

This will depend on the free height of your new squeegee and remaining useable height after multiple sharpenings. A typical new squeegee has a free height of 1.25», and we recommend a minimum height of no less than 0.75». This means you can sharpen away 0.50» material. If you remove only 0.010» per sharpening (ie, redressing the edge) your squeegee will last 50 sharpenings (0.50/0.01). If you sharpen less frequently but remove more material (ie, 0.020-0.030 for smoothing rough or damaged edges), your squeegee will last 25 or 16 sharpenings respectively. Note: if you use a squeegee cutter (using a disc/knife to cut a fresh edge on the squeegee), you will remove a lot more material with every cut (approx. 1mm) and “sharpening” may be limited to 4 or 5 passes.

Another direct cost savings from sharpening is a reduction in ink usage. A well-maintained, sharp squeegee edge could deposit up to 10% - 20% less ink than a dull or rounded edge. With an annual ink budget of $50,000 would amount to savings of several $1000!

How often should you sharpen a squeegee?

This will depend entirely on your quality requirements (and most certainly, of the properties of the polyurethane blade and the ink environment). If you want to maintain uniformity of ink deposit, color accuracy, and you want to reduce ink consumption, the squeegee should be sharpened every 5,000 impressions (or in some very severe ink environments, even less). On the other hand, if you simply want to maintain a smooth, sharp edge, you may choose to sharpen every 20,000-30,000 impressions.

To determine your Return On Investment (ROI), consider the following:

- **Savings #1**: The cost of squeegee blades will be reduced to 50%-66% of your current annual squeegee expense.
- **Savings #2**: Ink costs will be reduced 10%-20%.
- **Savings #3**: Production down-time/waste costs will be reduced 25%-50%.
- **Savings #4**: Product quality and customer satisfaction will be improved.

For example, a company annually spends $2,000 on squeegee blades, $20,000 on ink and has a record of 50% down time. After sharpening for one year, this company could show a direct savings of at least $3300 on squeegees and inks, and again as much on the indirect savings (#3 and #4 above).

Taking into consideration the cost of a sharpener manufactured by Fimor North America, a Return on Investment (ROI) can usually be achieved within one year or less.
THE DOLLARS AND SENSE OF SHARPENING

Does squeegee material change with age?

Most screen printers do not take into account that squeegee materials may change with age. While the effects of age may vary with a specific brand and formulation, as previously mentioned, squeegee material generally has a useful shelf-life of 12-18 months when unused and less so when regularly used, causing changes to its original physical characteristics and printing properties. If you buy squeegee blade material in bulk from a distributor, it probably arrives in a roll. Unroll it immediately and store it flat in a cool, dry location. Keeping it rolled on a shelf in heat and high humidity may dramatically shorten its performance life and the rolled condition can make it more difficult to straighten.

What affects the squeegee?

Nearly everything you do with a squeegee affects its performance. Constant use of a single blade without the prescribed rest period will cause it to permanently deform. Such distortion will mean your press setup must be adjusted for each and every “bent” blade. Some hydrocarbon solvents (and many inks - both solvent and UV) will cause the polyurethane to swell, become brittle and actually chip off in very small bits after constant use. Past a certain degree of swell, a squeegee may become impossible to re-sharpen.

How do you know if your squeegees have passed their useful life?

First, examine them carefully and frequently. Look at the color (they darken with age) and test the durometer of the squeegee. For screen printers, Durometer testers which utilize the Shore A scale can range in price anywhere $30-500 USD. However, for in-shop use, the lower-priced ones are less reliable for reading absolute values. If the durometer reading shows a change of 5-7 units on the gauge, it is time to substitute a new blade. (Note: as with any precision instrument, a durometer gage should be regularly calibrated by a professional).

Additionally, here is a simple test you can perform in your shop to determine the current condition of your material:

Put a small piece or the end of a blade in a vise and compress it to a third of its original thickness. Keep the vise tight for about 20 seconds; then release the pressure. If the material springs back to its original shape, it can still be used. If, however, it remains deformed from the pressure – and only slowly reforms, or not it all – it must be replaced.
HOW TO SHARPEN AND MAINTAIN SQUEEGEEES

Now that you understand why squeegee sharpening is both a profitable and a necessary step for screen printers, let’s talk specifically about what the sharpening process involves.

The first thing you need for sharpening is a piece of equipment that does everything we’ve discussed.

The ideal sharpener must be able to do the following things:

1. Provide a clean, smooth edge without burrs and imperfections that does not leave streaks, marks or uneven color on the printed surface (substrate).
2. Provide a uniform, straight edge from one end of the squeegee to the other that is consistently parallel with the holder. (This helps press setup and eliminate the need for extra pressure to compensate for free-height variations.
3. Provide uniform free-blade height along the entire length.
4. Sharpen all types of blades, regardless of sizes, composition or durometer.
5. Accommodate squeegee holders (handles) in a variety of shapes and sizes.
6. Provide accurate and adjustable material removal in small, measurable increments, allowing each squeegee to be sharpened repeatedly.
7. Sharpen profiled squeegees when needed, as well as accommodate custom profiles for unique job requirements.
8. Provide a variable (+/-) camber along the squeegee’s entire length in order to make long squeegees conform to the screen.
9. Be easy to use by operators on the shop floor, or it may not be used at all.

The second thing you need for squeegee care and maintenance is a clear procedure that spells out how and when to sharpen squeegees, and how to take care of them both on and off the press. These procedures should include (but not be limited to) the following guidelines:

1. Store a squeegee blade by laying it flat and not rolled into a “coil.” Coiled squeegee will eventually become permanently curved.
2. Rest assembled squeegees on the holders and not on the blades, or make a rack that keeps your squeegees separated.
3. Clean blades immediately after printing (this applies to UV inks as well), while the ink is easily removable. Scraping off dried ink can damage the blade.
4. Don’t soak squeegees in solvents. Although squeegee materials are formulated to be solvent resistant (up to a point), they do absorb some solvents and will eventually become brittle.
5. Don’t sharpen a squeegee right after cleaning because it is still soft and solvent-laden. Ideally, we recommend 12-24 hour “rest” for squeegees between uses. Not only does this improve the sharpening process, it will improve squeegee performance on press.
6. To provide yourself with a visual reference during the sharpening process, use a thick, dark marker to cover the entire surface to be sharpened with a band of color. By doing this, you will know that once the entire band of color is gone, you have successfully removed material across the entire length and width of the squeegee blade.
HOW TO SHARPEN AND MAINTAIN SQUEEGEE

7. If a large amount of material has to be removed from the blade (e.g., due to a nick or a cut), first use a coarse grit for faster material removal and then switch to a fine grit for polishing. **Never use a fine grit to sharpen a lot of material as this may burn the edge instead of polishing it. The finest grits should be reserved for the last passes of polishing only.**

8. **Remove as little material as necessary.** Once the edge is smooth and straight, there is no reason to continue sharpening. Only two or three sharpening cycles may be required to maintain a good edge.

9. **Remove the dust from the edge with a piece of soft cloth (non abrasive).**

10. **For the more sensitive printing jobs (transparent inks, large areas of solid colors…) use FIMOR's Diamond Fine Polisher after the sharpening process.**

11. **When possible, allow several hours for any heat build-up to dissipate before returning a newly sharpened blade back into production.**

CHOOSING THE SQUEEGEE SHARPENER THAT IS RIGHT FOR YOUR NEEDS

Now that you are fully informed of the obvious cost benefits and improvements to image quality that are attainable by sharpening your squeegee blades. While there are a variety of squeegee sharpeners available in today’s market, most sharpeners cannot meet the specifications for an outstanding machine with all of the characteristics described above, nor can they match the affordability of a serilor® sharpener.

More than 95% of the sharpeners used today are some kind of “grinding” device. Typically, these machines use a sanding wheel or belt. These wheels or belts usually come in a limited range of «grits» (coarse or fine) ranging from 60-120. While these options may satisfy average requirements, they cannot provide a smooth, polished edge on squeegee material. Also, if the wheel or belt is awkward or time-consuming to change, the operator will often «stick with» a worn or inappropriate grit and settle for lesser results.

Also available in the market place are sharpeners that slice the blade with a knife. Because cutting or slicing removes a substantial quantity of material during each sharpening, the 1/2” usable portion of the squeegee will typically last only about 5 sharpenings with such equipment. Because we believe that sharpening makes sense only if it saves money, all serilor® sharpeners feature micro-adjustment mechanisms to remove as little as .001” of material during sharpening. Knife cutters may first appear easier to use because they do not leave dust during the cutting process. However, be aware than the cutting of a resilient material like polyurethane is never easy. Knife cutting can damage a squeegee edge if the cutting blade is not in prime condition and if any vibration affects the process. Knife
CHOOSING THE SQUEEGEE SHARPENER THAT IS RIGHT FOR YOUR NEEDS

cutting is notoriously more difficult on multi durometer blades. And the sharp, knife-cut edge may in fact be too sharp and therefore fragile in some instances.

Fimor North America uses only industrial diamond-coated grinding wheels because they offer extraordinary performance on any composition or durometer squeegee material that is not abrasive resistant. These wheels carry a 5-year warranty against delamination. However, if properly maintained, they should never need replacement. When attached to a serilor® sharpener, these wheels provide a smooth, polished edge far superior to any sanding method. In addition, serilor® wheels come in a variety of grit sizes ranging from 60-360. Most serilor® sharpeners include one coarse and one fine grit wheel for the best possible results on all types of squeegees. Unlike sanding methods, these wheels can be attached and removed quickly and easily. Furthermore, serilor® wheels are available in various profiles for shaped squeegees. (There are six different profiles for smaller serilor® sharpeners and the standard square/straight profile for our large-format models. We can custom design wheels for unique job requirements.

SELECTION OF OPTIONAL GRIT SIZES AND PROFILES:

SQUARE/STRAIGHT (#60, #120, #230, #360 GRIT). Sharpens standard square-edge squeegees.

CENTER-SHARP (#220 OR #360 GRIT) Includes 60° angle for beveling 3/16” (5mm) squeegees to improve printing on rough or uneven substrates.

CENTER-BEVEL (#220 GRIT) Two angles available (70° or 90°) for beveling standard 3/8” (9.5mm) squeegees. Improves printing on rough or uneven substrates.

ROUND (#120 GRIT) Also known as “bull nose”. Rounds edges on standard 3/8” (9.5mm) squeegees for heavier ink deposit.

ROUND/SHARP COMBO (#120 GRIT) Rounds only one edge of 3/8” (9.5mm) or 3/16” (5mm) squeegees for variable ink deposit applications.

CHISEL (#230 GRIT) Includes 30° angle for chisel profiling: 3/8” (9.5mm) or 3/16” (5mm) squeegees. Chisel profile will improve adaptation in container decorating or when printing rough or uneven surfaces.
BEFORE SHARPENING SQUEEGEE,
consider the type, age, and cleanliness of the squeegee.

1. Identify the type of material
Different squeegee blades sharpen differently. Many polyurethane squeegees, though not all, will sharpen well, though some are made with special formulations that impart very high abrasion resistance. This type of squeegee blade will not sharpen properly with Fimor’s abrasive diamond coated grinding wheels. Such squeegee blades may take a long time to sharpen and overheat during the process. Others have thermoplastic fillers added for ease of fabrication and sharpening. These may melt at relatively low temperatures.

IMPORTANT: Before purchasing any squeegee sharpener, you should confirm that you are currently using blades which can be sharpened on the equipment you will be buying, or be prepared to switch to a different manufacturer of squeegee material before making your purchase. NOTE: All of Fimor’s serilor® blades can be sharpened will any of the Fimor sharpeners later described in this booklet.

2. Check for aging of the material
Most polyurethane squeegees will last 12-18 months before their physical properties demonstrate significant deterioration. Even new blades that are stored for a long time will show signs of aging including: changed durometer, lost resilience, and lowered melting point. When this happens, the squeegee will tend to melt onto the sharpening wheel or show a fractured edge after sharpening.

Remember - To test to see if the material is too old for printing and sharpening (see p8):

a) Use a durometer tester to determine the change in value of 5-7shA.

b) Put one corner of the squeegee in a vise and tighten it until the squeegee is only 1/3 of its original thickness. Leave it for 20 seconds and then release the pressure. The material should spring back to its original form within 20 seconds. If the squeegee does not spring back, the material is old and should not be used for printing or sharpening.

3. Make sure the squeegee is clean and dry, solvent and plasticizer-free.
Squeegees with wet or dry ink on them CANNOT BE SHARPENED! Nor can squeegees that come directly off the press and are still soft or swollen from chemicals. Squeegees must rest a minimum of 6 to (preferably) 12 hours between runs and should be sharpened AFTER the rest.
**DURING SHARPENING SQUEEGEE,**

Pay attention to the amount of material that is left on the diamond wheel and the temperature of the wheel.

-> If a heavy residue appears on the wheel, clean the wheel immediately with serilor® cleaning sticks. A starter package of 4 cleaning sticks is provided with your squeegee sharpener and an additional supply should be kept in stock. (These can be purchased from Fimor North America). When sharpening with a good quality squeegee, the diamond wheel should be free of heavy deposits. The slight residue on the surface can be cleaned periodically (between 5-10 cycles).

-> While it is normal for the wheel to heat up during sharpening, it should not run hotter than 140-170° F (which is far below the melting point of quality squeegee material). If you see any signs of melting, check both the wheel temperature and the quality of the squeegee material. There are 5 reasons for the wheel to get hotter than 170° F:

1. If the wheel is not cleaned regularly, the squeegee shavings will «bake» onto the wheel's surface, generating extra frictional heat, which only coats the wheel further. Eventually, the wheel loses its grinding ability because the diamonds are coated with baked plastic.

2. If the squeegee is not clean and solvent-free, it will hasten the particle deposit and baking process and will leave an UNREMOVABLE ring on the wheel. Inked or solvent-laden squeegees can ruin a new wheel within the first hour of use, especially if the wheel has a fine grit surface (e.g. 230-360).

3. If the wheel remains clean yet still heats up, chances are you are sharpening an abrasion-resistant material that is not designed to be sharpened with abrasive wheels. If the wheel is being used continuously it may not have a chance to cool down, especially if the sharpening unit has no vacuum. During continuous use, allow 2 minutes of cool down time between squeegees. Let the grinding motor run during this time (on automatic equipment, set the transport motor speed to “0” while the grinding motor is running).

4. If you are using the wrong wheel: do not use the fine grit, polishing wheel for removing large amounts of material or for too many cycles.

5. If you are trying to remove too much material in one pass (make sure the initial settings are set for the sharpening wheel to barely touch the highest point of the squeegee.
**AFTER SHARPENING SQUEEGEE**

Always clean the wheel thoroughly, using a cleaning stick, and examine it for baked-on deposits. If residue on the wheel resists the cleaning stick try to clean the affected areas with a strong polyurethane paint remover. This picture is an example of one product that is readily available in the paint department of large building supply and home repair warehouse-style stores. Remove the wheel from the machine, and submerge it in a container with the polyurethane remover, allowing the residue to soften for about 20 minutes. Wearing gloves and eye protection use a medium-stiff non metallic bristle brush to extract any remaining residue on the wheel and then rinse off the paint-remover and allow the wheel to dry. After drying, rub the diamond surface clean with the Cleaning Sticks.

(Note: 6” wheels are coated with high-temp black paint to enhance heat dissipation. If the black paint on all-steel wheels is removed during cleaning, recoat the wheel with a high temperature resistant black paint, such as Rustoleum 7778 Black. Make sure to mask off the diamond surface during painting.)

Also available in the market place are sharpeners that slice the blade with a knife. **Because cutting or slicing removes a substantial quantity of material during each sharpening, the 1/2» usable portion of the squeegee will typically last only about 5 sharpenings with such equipment.**

Because we believe that sharpening makes sense only if it saves money, all serilor® sharpeners feature micro-adjustment mechanisms to remove as little as .001» of material during sharpening.

**serilor®** sharpeners are designed to meet a variety of needs, providing small, inexpensive units for the manual print shop and large-format models for shops using squeegees up to 10 feet (3 meters) long. While many existing sharpeners (particularly belt sanders), require the operator to physically hold the squeegee during sharpening, ours **feature a clamping mechanism which holds the squeegee firmly by the blade while the diamond wheel is moved (automatically or manually) across the squeegee.**

This feature is particularly useful for automated press users because the sharpener can accept any shape squeegee handle. Additionally, this configuration straightens the blade parallel to its handle. So, no matter how poorly a blade was placed into its’ holder, the sharpener will bring it square. **IMPORTANT: Each squeegee blade MUST be sharpened in the holder in which it will be used for printing. This will not only assure a well sharpened edge but one that it is parallel to the holder and will be parallel to the substrate.**
AFTER SHARPENING SQUEEGEE,

Another unique advantage found on serilor® sharpeners is the variable camber. Models for squeegees 60” (152cm) and longer (Diamond-Kut and Diamond-Kutronic series) are equipped with this feature. Why? Because many long squeegees tend to have a negative camber (curve) at the middle, either due to poorly assembled squeegees and/or press set-up or because of poor sharpening (e.g., a belt sander). A negative camber on a squeegee will result in less pressure at the middle of the squeegee. This pressure difference will show up as a color variation, dot gain, and poorly defined edges in the center of the image. To correct this problem, serilor®’s Diamond Kut and Diamond Kutronic series sharpeners have a positive camber set at 0.030-0.060” (depending on the length). This camber can be reset to any value (including a straight “0”) by the user.

Whether your needs are large or small, automated or manual, Fimor North America has the squeegee sharpener for your requirements. Take a look at these brief descriptions of our full range of machines and then compare them with any other squeegee sharpener on the market.
OUR serilor® DIAMOND WHEEL SQUEEGEE SHARPENERS

Important: All of these sharpeners are designed to sharpen a squeegee blade while still supported in its squeegee handler.

serilor®EEZ KIT 115-120V: DEK-136; 220v: DEK-236
A money-saving build-it-yourself kit designed for very small or start-up operations using only manual-printing handles. The user supplies the table top and base materials and simply attaches the components included in the kit. It sharpens squeegees up to 36” (91cm) long. Two diamond wheels (60 and 120 grit) are included.

serilor®SHORT-CUT 115-120v:DSC-020; 220v: DSC-220
The small-format, manual, precision squeegee sharpener, to use with squeegees up to 20” (51cm) or less. This portable table-top design fits anywhere and comes equipped with a single 1” industrial strength diamond-sharpening wheel (120 grit). Optional wheels are available.

serilor®MAXI 115-120v: MX-138; 220v: MX-238
The medium format, manual precision sharpener for squeegees up to 38” (97cm). The operator moves the wheel with a hand guide along fixed tracks across the squeegee’s printing surface on this table top model. Two 1” diamond wheels (60 and 120 grit) are included. Optional wheels are available.
OUR serilor® DIAMOND WHEEL SQUEEGEE SHARPENERS

serilor® MAXITRONIC  115-120v: MXTR-137, MXTR-148; 220v: MXTR-237, MXTR-248
The medium size, fully-automated, free standing precision squeegee sharpener, available in two different models: one accommodating squeegees up to 37" (94cm) and the other accommodating squeegees up to 48" (122cm). The Maxitronic is ideal for printers using automatic presses, as it controls all variables for optimum accuracy. The operator simply presets the number of cycles and the diamond wheel will automatically advance to remove .002"-.004" (2.-4 mils) of material per cycle. All units include a floor stand. 110V units also include vacuum unit for residue removal. 220V units are vacuum ready (vacuum to be supplied locally by end-user in accordance with local requirements) and are shipped with a spare parts kit. Two 1" diamond wheels (60 and 120 grit) are included. Optional wheels are available.

serilor® KUT  115-120v: DK-160; 220v: DK-260
The high quality, manually operated sharpener for longer squeegees in two sizes to sharpen up to 60"(153cm) or 76" (193cm). Clamping mechanism holds squeegee blade parallel to grinding wheel without bending or flexing the blade during sharpening. Two 6" diamond wheels (100 and 360 grit) are included.

serilor® KUTRONIC  115-120v: DKTR-160; DKTR-176; DKTR-196; DKTR-1120
220v: DKTR-260; DKTR-276; DKTR-296; DKTR-2120
The medium format, manual precision sharpener for squeegees up to 38" (97cm). The operator moves the wheel with a hand guide along fixed tracks across the squeegee's printing surface on this table top model. Two 1" diamond wheels (60 and 120 grit) are included. Optional wheels are available.
MAINTENANCE TOOLS AND ACCESSORIES

At Fimor North America we understand the role that squeegees and squeegee sharpening play in producing a quality screen-printed product. Additionally, we provide the following useful squeegee maintenance tools and accessories.

serilor®CUT
Handy and economical tool leaves clean, precise ends on any width, thickness or durometer.

serilor®CLIPPER
Convenient tool for safely rounding squeegee corners, to prevent mesh wear.

serilor®CUTTER (US MODEL)
Convenient tools for safely and cleanly cutting squeegee to length, reducing occupational hazards and improving handling of PU blades.
MAINTENANCE TOOLS AND ACCESSORIES

serilor®HAND
Gold anodized squeegee holders for manual printing. Adapts to various squeegee sizes with no glue. Stiff, light, easy to maintain for life long use.

serilor®BLADE RUNNER
This revolutionary unit utilizes compressed-air driven components and screen cleaning solvents to wash ink from squeegee blades quickly and efficiently right on the production floor.

serilor®DIAMOND FINE
Surpasses all other manual devices for consistent polishing of both squeegee edges simultaneously. Prevents strikes and early wear.
We trust we have succeeded in providing you with a thorough understanding of the importance of the squeegee, a seemingly simple tool, yet the role it plays for the screen printer is no less important than that of a scalpel to a surgeon.

**PRACTICAL TIPS:**
**A SQUEEGEE IS A SQUEEGEE, IS A SQUEEGEE...OR IS IT?**

**ESTABLISH A SQUEEGEE POLICY IN YOUR SHOP, WHICH INCLUDES:**

- **Implementation of a training program** for proper selection of squeegees, their use and maintenance.
- **Keep records** to indicate which squeegee(s) were utilized on each job, along with individual parameters (i.e. – angle, pressure, etc.) for high quality, repeatable results.
- **Do not assume** the same results from different urethane manufacturers.
  - Squeegees from different manufacturers with the same durometer (hardness) ratings may have dramatically different modulus (flexibility) ratings.
  - It is possible to have 2 brands of squeegees of the same durometer with different flexing characteristics.
- **Avoid confusion** on the production floor. Do not order squeegee solely by color. Color-coding varies by manufacturer. Specify durometer and brand.
- **Plan squeegee purchases** in advance to minimize multiple references (brands, types), reduce errors, maximize efficiency and cost saving.
- **Assure adequate inventory** of frequently used references to maintain process standardization.
For more information and specifications on our full range of senilor® squeegees, sharpeners, maintenance products and accessories,

visit our website: [www.fimor.fr](http://www.fimor.fr)

or call Fimor North America at

**1-800-922-5138 (US and Canada), 941-921-5138 (outside US and Canada)**

with any additional questions or for current pricing on all of our equipment or to locate your local distributor.