

Basics & Best Practices

In the past, cutting mainly involved paper and occasionally thin cardboard or glassine paper. However, the variety of materials in use today is much broader, ranging from thin stencil duplicator paper to plastic sheets, floor covering materials, metal foils, and plywood. Even thick wooden veneers, traditionally cut by saws, can now be precisely cut with high-speed cutting machines, reducing waste and improving accuracy.

Modern high-speed cutters are expected to handle a wide range of materials, performing cuts with hairline accuracy. They need to be versatile, capable of handling both large and small jobs efficiently, and must be able to cut every type of material presented.

Customers increasingly demand high-quality printing and cutting, even for small jobs. They notice the quality of cuts, whether they are straight or uneven. Thus, the quality of the cutting process is as important as the quality of the printing.

Issues in the cutting process are typically attributed to poorly adjusted clamping pressure, incorrect knife angle, improper knife quality, or blunt knives. These factors greatly influence the quality of the cut.

Knife manufacturers generally advise sharpening standard steel blades every eight hours of use. However, when cutting materials like chipboard or paper with glue, more frequent sharpening may be necessary.

The blade's performance is also influenced by the bevel's size: larger bevels are suitable for cutting hard materials as they have a stronger edge that resists chipping, but can cause issues like undercutting when used on softer materials. Conversely, smaller bevels, while more prone to chipping, are better for soft materials, offering clean cuts without undercutting or draw.

Materials & Knife Blade Angles

Soft Cutting Materials – These include materials like flimsy stencil duplicator paper, tissue, and blotting paper. They are known for their poor sliding properties, high air volume in the pile, and inherent softness. Soft materials require high clamping pressure (150 to 7000daN), and issues like “over-cut” (upper layers being cut shorter than lower ones) can be mitigated by using a narrow cutting angle, increased pressure time, or applying a false clamp plate.

Regular Cutting Materials – These are materials that can be effectively processed with a 24° knife angle and a medium clamping pressure, like writing paper and common printing paper. Using the highest clamping pressure is not advised as it may lead to overcutting.

Hard Cutting Materials – This category includes materials such as art papers, gummed papers, cardboard, and plastic foils. Problems arise mainly due to the deflection of the knife during the cut, often because of an excessively narrow cutting angle. A bevel with a wider angle is recommended to maintain good material flow and avoid significant loss of knife material.

Differences Due to Material Thickness – Variations in material thickness can lead to convex or concave cuts. Convex cuts occur in materials that are higher in the center, causing the ends to be pulled out by the knife. Stitched materials may become shorter on their open side due to insufficient clamping pressure. Height differences in reams less than 4 mm can be leveled with a flexible false clamp for steady pressure.

Geometry of Angles and Overcuts – Overcuts can be caused by burrs or dirt on the knife surface or knife beam, causing the knife to be out of its true vertical position. For hard cutting materials, an obtuse knife angle is recommended, whereas soft materials benefit from a slender knife angle.

Knife Servicing & Maintenance

Importance of Correct Knife Angle – Different materials require specific knife angles for optimal cutting. A standard angle of 24° is recommended for a variety of materials. The selection of the right angle and knife quality significantly influences the cutting quality and the economical operation of the cutter.

Safe Storage and Handling – Knives should always be stored in their special box for safety and to protect the cutting edge from damage. When replacing a knife, it should never be placed directly on the machine table without a protective cardboard or wooden support underneath. This precaution is necessary to prevent damage to the knife and the machine.

Maintaining Knife and Equipment Integrity – Surfaces of both the knife and the knife bar must be free from burrs and dirt. The threaded fixing holes in the knife and the screws, which ensure firm and precise seating, should be kept in perfect condition. Initially, all knife screws should only be slightly tightened to prevent damage during the final firm tightening.

Knife Adjustment – After the knife is securely screwed down, and all tools have been removed, it must be adjusted. At its lowest position, the knife should be parallel to the machine table and just slightly touching the cutting stick.

Dressing the Knife – Post-grinding, the knife requires careful dressing as this greatly affects both the quality of the cut and the service life of the knife. Rectangular grindstones, not too small to prevent canting, are used for dressing. To remove the grinding burr, a stone with fine and soft graining is recommended, and for finishing, an Arkansas oil stone is advised. The knife should be placed on a flat surface during dressing to ensure secure and precise movement of the stone along the cutting edge.