THE EASTMAN ®

Blade Reference

⚠ WARNING
Always handle blades with care.
Safely dispose of used blades

Straight Knife Blades

Carbon Steel- Economical blades. Carbon blades are softer than high speed steel. These blades sharpen easily because of the softness of the carbon. Carbon blades are available in the following variations:

	Straight Front:	Saw Tooth:	Wave Edge:
Applications	Soft goods such as cotton, fleece, wool, jersey or knit fabric.	Cardboard	Materials that fuse such as rayon, nylon, urethane, or other synthetic goods.

High Speed Steel- Premium quality hardened steel. These blades keep their sharp edge longer than the carbon blades. High Speed Steel blades are offered in the following variations:

	Straight Front:	Round Tip/ Angle Tip:	Saw Tooth:	Wave Edge:
Applications	Soft goods such as cotton, fleece, wool, jersey or knit fabric.	Hard goods such as denim, canvas, duck, and kevlar. Angle Tip is used for the hardest of materials.	Cardboard	Materials that fuse such as rayon, nylon, urethane, or other synthetic goods.

Note: With Straight Front, Round Tip, and Angle Tip blades 100% of the knife touches the material generating heat. Three ways to reduce heat include lowering the distance the blade travels up and down, lower the blade speed, or reduce the surface of blade touching the material.

Teflon Blades- Some straight front and Wave Edge blades are available with a Teflon Coating which reduces blade heat while cutting. This prevents material from fusing during cutting. Consult factory for availability.

Round Knife Blades

	Octagonal/ Hexagonal/ Semi-Square:	Single Bevel / Double Bevel:
Applications	The semi-square blades are an alternative to scissor style cutting. This type of blade chops rather than shears. These type of blades are used on any material that strings or unravels.	These blades have a single or double bevel. These types of blades are used for cutting any fabric that does not string or unravel.

Note: All round knife blades contain a hole in the center of the blade where the blade is attached to the machine. Eastman blades are available with a keyway and flat holes. Keyway holes have a notch on either side of the hole, while the flat hole is a semi-circle with a flat side.

Note: Some blades are available with a teflon coating or special grooves, but not both. Teflon coating eliminates rust when blades are used with a lubricant. Special grooves are available on some blades to allow lubricant to reach the entire blade while cutting extremely dense material. Consult factory for availability.

Eastman machine COMPANY

779 Washington St., Buffalo, N.Y. 14203-1396 U.S.A. • (716)856-2200 • Fax (716)856-1140 or (716)856-2068
Manufacturers of Eastman Cloth Cutting and Cloth Spreading Machines
Website: www.EastmanCuts.com

Round Knife vs. Straight Knife Cutting

The following is a brief explanation of the basic distinctions between the round knife and the straight knife in terms of cutting capabilities.

A round knife machine is commonly used to cut straight lines or large radius curves: Caution is advised, however, because the degree of accuracy will vary from the top to the bottom of a layer of material. For straight cuts only the round knife is unsurpassed. Cutting capacities for the machine range from a single ply to approximately six inches depending on the size of the machine used.

A straight knife machine is designed to cut out patterns, as well as straight lines in multiple thicknesses of material. Its cutting capacity ranges from an effective height of one inch to twelve inches.

Variables in Choosing the Right Machine For the Job

The problem facing the manufacturer involved in the cutting of fabric is one that is common to all manufacturers-- rising costs. In order to combat these costs, the manufacturer has an obligation to put the right piece of cutting equipment in to the hands of his cutters so that the job is done as fast as possible with spoilage and waste reduced to a minimum. Thus, speed and accuracy of cut become the two main factors for an efficient cutting room.

Cutting speed, or how fast an operator can cut, is determined by two factors- the density of the material and the speed of the cutting blade. Obviously, the density of the fabric cannot be controlled. Therefore, if an increased cutting speed is desired, you should look at what kind of output your cutting machine is giving you.

To determine the knife speed of a straight knife cutting machine, the following table can be used for a machine running at 3600 rpm:

Knife Stroke	Knife Speed
1-1/8 inches	675 feet/min.
1-1/4 inches	750 feet/min.
1-1/2 inches	900 feet/min.
1-3/4 inches	1,050 feet/min.

Obviously, a machine running at 1,050 feet per minute will cut faster than at 675 feet per minute. Therefore, it is desirable to obtain the largest stroke possible for cutting very dense material. Another factor involved with knife speed is motor power. The motor of a cutting machine generally runs at 3600 rpm under a no-load condition. Cutting, however, reduces the motor speed which has a direct result in decreasing cutting efficiency. More powerful motors, such as the one used in Eastman class 627 Brute, which has an out put of two horsepower, have been developed to give the fabric cutter a great capacity by maintaining the motor speed throughout the cut.

The following chart shows the proper stroke or knife speed to use when cutting various materials listed:

Feet/min	Stroke	Material
675	1-1/8"	Fusible material such as plastic, PVC vinyl, and reinforced vinyl, primarily non-woven materials. Recommended knife sizes: 5",6",7".
750	1-1/4"	Fusible blends from 40% to 90% man-made fiber such as polyester, rayon, nylon, dacron, and herculon woven materials. Recommended knife sizes: 5", 6", 7", 8".
900	1-1/2"	For cutting general types of material with 35% or more natural fibers such as wool and cotton blends for woven and knit materials. Recommended knife sizes 5",6",7"8",9",10",11".
1,050	1-3/4"	For large standard sized 11-1/2" and 13" machines to accommodate pile, quilting, Borg, and insulating material for knit and woven materials. Also, for maximum cutting ability in cutting very dense material such as denim, corduroy, and canvas. Recommended knife sizes 6",7",8".

The cutting efficiency of a round knife is determined differently. In deciding what round knife to use, the following factors should be taken into consideration: gear ratio, motor speed, and blade diameter. Basically, round knife machines have three gear ratios- 2.5:1, 3:1 and 4:1. By dividing the gear ratio into the motor speed, you can determine the blade rotational speed.

For example, a 4:1 gear ratio gives blade rotation of 900 rpm. If you then determine the circumference of the blade by using this formula (3.1416 x knife diameter) and multiply this times the rotation speed (rpm), you will arrive at the actual cutting speed. Common blade diameters for round knife machines are 4 inches, 5-1/4 inches, 6 inches and 7-1/2 inches.

Now that the means for determining cutting speed have been set up, you should have the guidelines for picking the right specifications for your cutting machine. However, a note of caution is needed. It is a false assumption to believe that the fastest cutting speed will result in the most efficient cutting. An operator must balance the need for high speed with the practical limits his fabric places upon him. A high knife speed tends to create a large amount of friction. This friction will melt synthetic materials like nylon causing a condition called fusing. Therefore, a machine must be setup with the highest possible speed for use on synthetic material that will not cause fusing.

Fusing frequently occurs on tight turns and not straight cuts. To eliminate this problem, dual speed machines with two separate motor speeds, 3600 rpm and 1800 rpm, are available. The Eastman dual speed machine can reduce speed in the middle of a cut without stopping the motor. With this piece of equipment, it is possible to "downshift" in a turn to eliminate fusing and speed up again on the straight cuts.

Another problem that frequently plagues cutting rooms is the fraying of cut material. Fraying or pulling off of the fabric threads is usually the result of too high stroke. In these situations, an operator must sacrifice cutting speed to protect against material spoilage caused by fraying.

Troubleshooting Chart For Straight Knife Machines

PROBLEM	SOLUTION
Motor overheats	a. Cut out switch not engaging properly b. Lint and dust inside motor cover c. Three-phase: one phase not working
Machine does not start	a. Connector not firmly attached to terminal pins b. Start switch defective c. Starting switch or cut-out switch and/or capacitor defective
Bottom corner of blade breaks	a. Knife slides badly worn b. Knife strikes throat plate.
Motor slow to attain top speed	a. Sharpener is engaged b. Cut out switch not adjusted properly c. Low or wrong voltage d. For three-phase machines: 1. Fuse out on one phase 2. Ground wire incorrectly connected to machine
Motor slows in a certain position	a. Crosshead and guides tight b. Standard not in alignment with crosshead c. Standard bent
Motor rotates in wrong direction	a. Three-phase: incorrect wiring
Terminal block and/or electrical connector overheats	a. Inserts in connector worn. Change connector. b. Terminal pins worn

PROBLEM	SOLUTION
Machine does not move easily on table	a. Surface of cutting table not smooth b. Rubber mounted rollers compressed causing baseplate to drag on table
No bevel on one side of blade	a. Broken torsion spring b. Band plates do not pivot freely
Sharpener belt cut off by blade	a. Refer to page 8, *Checking the Extreme Down Position of the Sharpener*
Pressure foot rod does not move freely	a. Dirt in pressure foot lock bracket
Pressure foot rod does not hold	a. Lock loose on shaft b. Pressure foot handle spring broken c. Teeth worn on lock d. Screw loose
Sharpener runs slowly	a. Oil on crank b. Stabilizer assembly too tight against standard c. Worn pulley d. Worn screw shaft e. Add grease to lower gear bracket
Bevel very wide on both sides of blade	a. Worn sharpener shoes

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