

## THE PRINTING PRESS DRIVE TRAIN

V-Belts, like other moving parts on the press, are subject to wear. While they are manufactured with a combination of rubber and cord for extra strength and durability, they will eventually stretch, become frayed, lose their resilience and become ineffective by losing their gripping ability. Belts coming in contact with lubricants also cause damage.

It is important for the press operator to realize that V-belts are made to standards and specifications. You cannot just pick a belt from the rack and install it on your machine. Not only is the V-Belt's width and diameter tapered, but also it uses a pitch that must correspond to the sheave and pulley that it is driving.

Regardless of the manufacturer, most belts can be cross-referenced by the numbers appearing on the belt. Undoubtedly, some manufacturers produce a better belt than others. However, belts are also classified for job ratings by the quality of the manufacturing. The important thing is that you use a quality belt intended for your machine.

When belts need replacing, always replace them in sets to assure uniform performance from each belt. When installing the new belts, use the adjustments provided to relieve and apply pressure. Don't damage the belt by stretching it over the sheave. It should be adjusted and reseated in the sheave. Belt tension should be checked carefully, as over tightening will cause serious stress on the drive motor from overheating. Bearings are used in the side frames of the press to help provide lubrication and the shafts run true. On small presses, shafts used to support and rotate using pulleys can be flexed and cause a bind by over tightening belts. This is a common occurrence.

Other than creating a bind, proper tension is needed on V belts to correctly contact the sheave. Unlike the round belt, or flat belt, all torque is directed against the side of the sheave. The taper of the belt must seat firmly against the taper of the sheave. The belt is not intended to contact the bottom of the sheave. The contact would lessen the effective action by relieving pressure on the sides, lessening the gripping action. (Stretched or worn belts). The seating of the belt in the sheave should allow the belt to ride just slightly above the pulley.

Before making the final adjustment, rotate the hand wheel of the machine to allow the belts to seat evenly in both the driving and driven sheaves. At the same time, checks to be certain both sheaves are in perfect alignment. Misalignment alignment of pulleys creates problems for any belt driven system, but even more for v belts and sheaves.

### Checking Belt Tension

Mechanics all have their own method for checking belt tension. Some use a fist to hit the belt, using the reflex to determine the tension. Others use a 1/2-inch give in the belt tension from both sides of the belt when squeezed together to adjust the belts. The important thing is V-Belts need a tension that will eliminate slack in the belt. Over tensioning will cause problems.

Care and maintenance of V belts other than adjusting is almost non-existent as previously stated. The largest problem is contact with lubricants. There are no special cleaners, other than wiping clean with a dry rag. To our knowledge, no belt cleaners are formulated and sold, and belt dressing is not recommended. Press owners and operators largely overlook wear and replacement of V belts on printing presses. They do make a difference in a smooth operating drive train.

### Speed Control

Many newer small offset machines are now using speed controllers, which are tied into the electrical system through an electronic board, and controlled from a central panel. But, many still use the basic variable speed pulley.

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The variable speed is a universally used, un-complicated system of raising and lowering the speed by driving a turning shaft with different diameter pulleys. The pulleys used are tapered sheaves driven by V-belts to control the position with respect to the depth the belts will ride.

As with other sheave type pulleys, the V-belts are tapered to correspond to the pulley using the torque created by the side of the belt rather than the bottom. Instead of one piece, it is manufactured as two separate side plates. The halves are joined by a shaft and held tightly together by a compression spring. By raising and lowering the motor mounting plate with either a lever or a crank, the tapered belt will lower into the pulley and separate the plates as tension is put on the belts. The spring pressure between the two pulley halves will take up the slack in the belt and force the belts to ride higher as the tension is relieved from the belts.

Normally the variable speed pulley is fastened directly to the shaft of the motor, directly driving another pulley. When the belts are riding high it takes on the characteristics of a larger pulley, changing the drive ratio between the pulleys - under most circumstances, increasing the speed. As the belts drop lower, it becomes a smaller circumference and lessens the speed. Obviously, the speed is changed in increments by the crank or lever. However, the increment posted on the press does not necessarily reflect the speed.

The variable speed is universally used on all types of machinery. It is economical for manufacturers to install on machinery. It is simplistic and works well, but when used under stressful conditions such as a printing press, it needs maintenance.

Most pulley halves use a key and key way slot to mount the pulley halves in alignment on the shaft. The halves need to slide on the shaft as the belt raises and lowers into the pulley. If a bind develops because of lack of lubrication, the belt forces the pulley apart - causing vibration and strain on the motor plate and belts. It also becomes noisy. The belts produce heat, causing the un-lubricated pulley to form rust, which will wear away the key and enlarge the key way. When this damage is allowed to go unchecked, the pulley will become ineffective and need to be changed.

The binding pulley halves will also pinch the belt causing premature wear. Changing the speed of the press - when not in operation, forces the belt into the pulley rather than using a turning motion to allow the belts to seat into the halves. Improper adjustments of the motor plate when attempting to regulate the speed are another source of problems. The belt should never bottom out to the point that it supports the weight of the motor. This causes vibration and noise. A belt riding too high on the pulley will cause loss of torque. Always use the manufactures speed recommendations.

Certain pulleys are equipped with grease fitting, but are usually hard to access. Belts should not be exposed to grease. The most common way used to lubricate the pulley is to separate the halves with a screwdriver. Spray the shaft with a lubricating oil, the work the halves several times to be certain they are sliding freely on the shaft. If you decide to remove the pulley from the motor and disassemble it, to inspect for wear, care needs to be taken. The coil spring is usually compressed on the shaft tightly. When the clip or fastener is removed, the spring can fly.

When replacing the pulley on the motor, tighten it securely on the flat of the shaft to prevent slipping.