

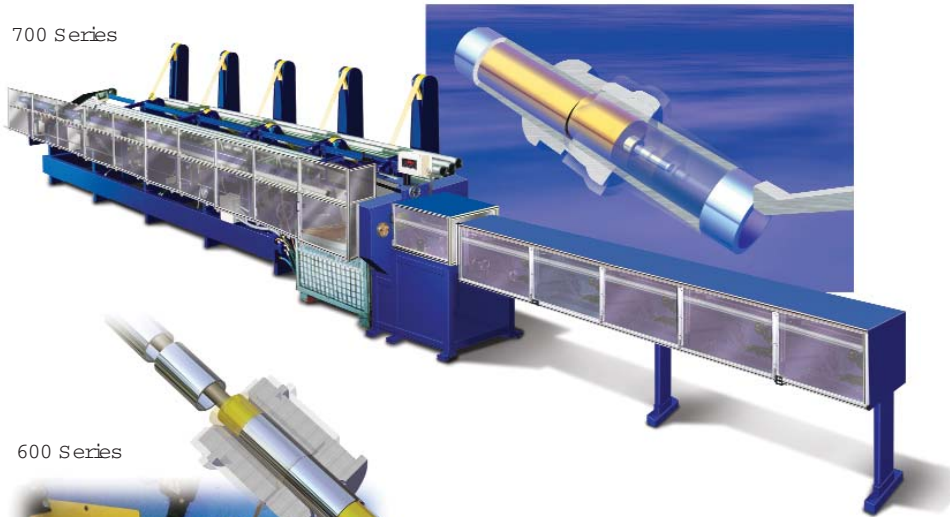
KleenCut™ Supported Shear Cut

Overview

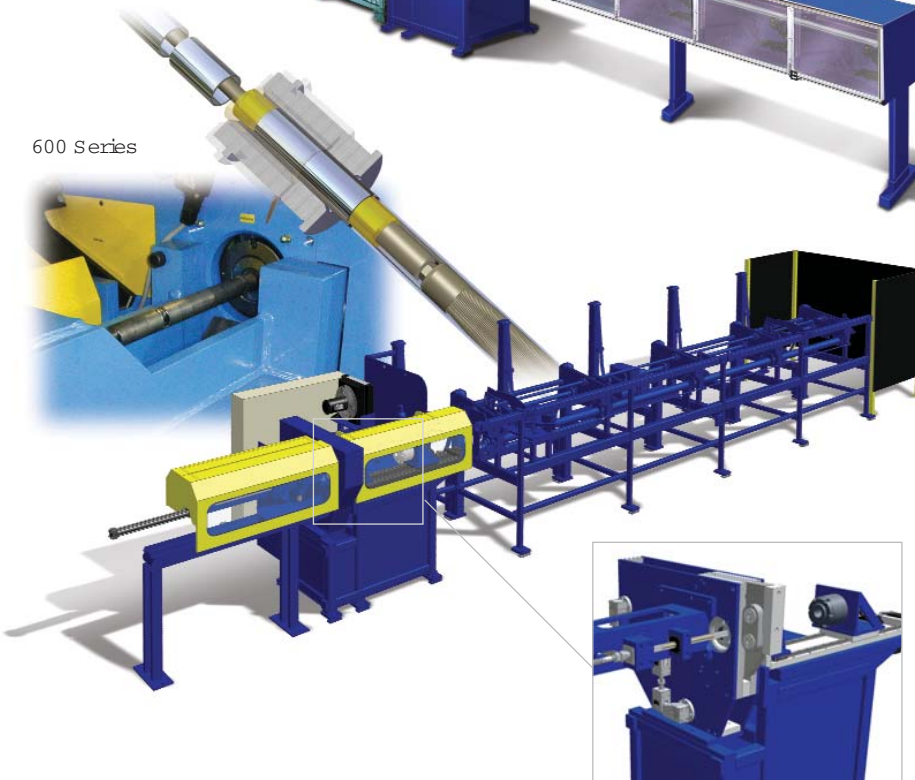
To remain competitive in today's metal tube market, tube manufacturers must meet their customer's increasingly difficult demands for tubes with diverse applications. Tubes are used in products across a broad range of industries, including automotive, aerospace, appliances, medical, health and fitness, HVAC, furniture, and storage. There are numerous applications, with more being developed all the time, resulting in various

shapes, lengths, and materials. This variety does not reduce the demand for high quality, fast delivery, and competitive prices. Tube manufacturers must respond to each customer's ever changing requirements while controlling production costs in order to achieve the margins needed to invest in their business. Today's metal tube market poses a very complex set of problems for tube manufacturers.

700 Series



600 Series



SUMMARY:

Haven's supported shear KleenCut machines increase productivity, reduce changeover time, and improve accuracy. KleenCut's unique advantages have enhanced Haven's reputation for quality, durable, and accurate tube cutting systems. Haven's KleenCut supported shear machines are easy to reconfigure and produce burr-free cuts. They offer the flexibility to quickly change from one production run to another, with different materials, diameters, and lengths. This means tube manufacturers can remain competitive and profitably offer customers the service, delivery, price, and quality they demand. Visit Haven Manufacturing's website www.havencut.com to learn how very satisfied customers continue to rely on Haven to meet their service and delivery requirements and to achieve their revenue and profitability objectives.

Challenge

The increasing applications for metal tubes result in a demand for many shapes and sizes. New materials are being developed to provide end-users with innovative solutions to meet their performance criteria. In today's highly automated world, components must be designed to precise specifications to ensure a seamless integration into the final assembly of the finished item and minimize failure rates.

Achieving these mutually exclusive objectives can be difficult and maintaining cost, quality, and delivery continues to pressure companies in the competitive global marketplace. Successful tube manufacturers require a high quality cutting system that produces accurate, burr-free cuts. It must be efficient, with easy changeover, and integrated into the total tube processing operation. Additionally, companies must solve

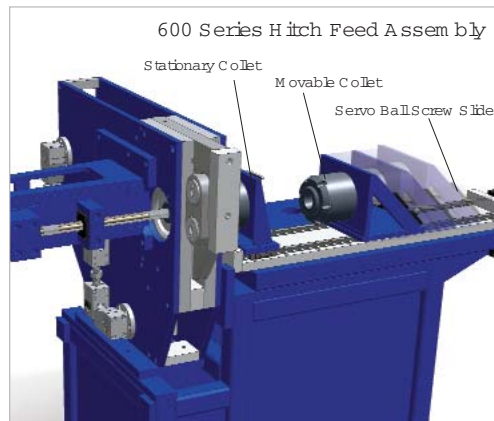
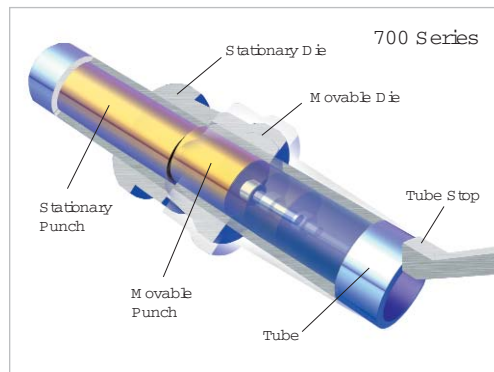
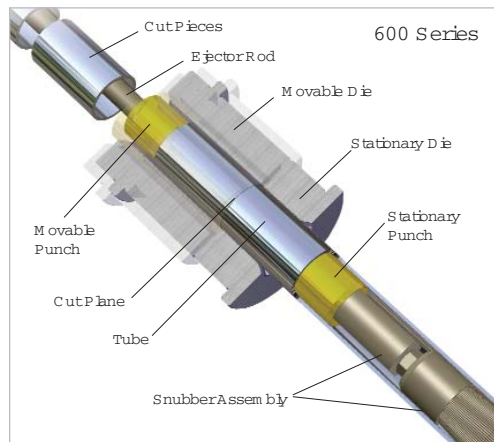
the problems of producing a wide variety of high quality tubes from different materials and having short production runs with minimal changeover time. They must also control costs by minimizing secondary operations, reducing material loss, and requiring less expensive machine operators.

Solution

KleenCut™ Supported ShearCut

Haven Manufacturing, a worldwide leader in supported shear tube cutting technology, offers a series of automatic high-speed cutting systems called "KleenCut" that meets the challenges today's metal tube manufacturer's face. Haven's KleenCut products deliver near burr-free cuts that usually require no secondary finishing operations. The cut is made by shearing across the cut plane and there is no material loss. This technology is ideal for drawn-over-mandrel (DOM) or equivalent dimensional tolerance tubes, but it is also used in a variety of as-welded applications. The tube is supported from two external die rings and an internal punch assembly that form a shear plane. Half of the tool set is stationary and the other half moves both vertically and horizontally. Once the raw tube is in position, the moveable side shears and separates the tube from the stationary side. This cycle repeats for the length of the raw tube and then another is automatically fed into position. Upstream operations, like a bundle unscrambler, can be added to the KleenCut. The nearly burr-free shear cut usually requires no end finishing operations, but the system can be easily integrated into secondary processes, such as chamfering.

There are two models of the supported shear cutoff system, the 600 and 700 Series. The 600 Series is designed for heavier wall and shorter length tubing. This versatile system can accept raw tube from either straight stick or coil. Stick application tubes can be advanced from a magazine rack or an automated bundle unscrambler into the transfer hitch-feed device. The hitch-feed determines the cut length. It has precision linear rails and guides which are controlled by an electric servo motor and lead screw. The cut tool has two outer die rings and two "floating" internal punches. The stationary side of the punch, or load side, is backed by a snubber assembly. The forward feed provides frictional force against the snubber, keeping the punch in-line with the die centerline. The movable side is held in place by an ejector rod that acts both as a support member for the punch assembly and as a stripping rod for the cut parts. The sheared part is deposited over the rod until the rod is full. The full rod automatically



retracts, stripping the parts, and then returns to the cut position to restart the cycle.

The 700 Series is designed for straight stick only and can cut longer lengths than the 600. It can be integrated with a magazine rack or automated bundle unscrambler, both having an escapement device that lowers each tube onto the loader feed assembly. A pusher carriage moves the tube through the cutting dies and over the internal punch and support mandrel. The carriage has a precision linear rail and guide that is linked with a 50-pitch drive chain, connected to a variable speed hydraulic motor. The tube support mandrel is designed with evenly spaced bronze spacers to minimize tube sliding resistance. A side pusher carriage feeds the tube back through the cutting dies and depresses a target trigger which activates the cutting cycle. The trigger then retracts to allow the cut tube to fall out of the way and then returns to restart the cycle. The target assembly can be adjusted via a manual lead screw and positioned according to a digital display.

Both series have 2 high-pressure cylinders with hydraulically adjustable timing sequences that are controlled from the operator panel. Maximum cutting efficiency is achieved through a proportional valve design which offers infinite cutting stroke adjustment, depending on tube material and wall thickness. Each cylinder is attached to a concentric shaft, making it easy to precisely align the dies to the cutting centerline.

Benefits and Future

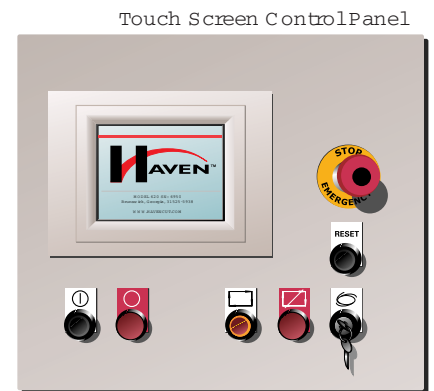
Haven's KleenCut supported shear cutting technology is near burr-free, typically requiring no end-finishing, and with none of the material loss associated with saw systems. They have high throughput, cutting up to 5,700 pieces per hour with cut length tolerance of +/-0.010 inch (+/- 0.25mm). Although the life of cutting tools varies with tube material and wall thickness, the KleenCut system offers outstanding tool cost with mild steel applications yielding over

150,000 cuts prior to re-sharpening. The tool design allows up to 75 re-sharpenings further lowering the cost per cut.

KleenCut has simple changeover. Conventional depth micrometers position the dies and punches to the cut centerline. Cut cylinder stroke is adjusted from the operator panel. The amount of stroke per cylinder and the distance the vertical cylinder travels before the horizontal cylinder fires are

entered on the keypad. This gives tube manufacturers the ability to profitably accept smaller quantity orders. This flexibility increases new business but also helps retain current customers with smaller projects.

Haven's products, like KleenCut machines, have an international reputation for reliability and machine uptime. When combined with their fast service, Haven's products have highest availability in the industry and the lowest total cost of ownership.



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