

Sheet Feeder

Cantec supplies a range of sheet-feeding systems perfectly suited for your applications.

Straight feeder

for straight-sided and scrolled sheets or coil feed (operating without idle strokes)

Single zig-zag sheet feeder

for straight-sided and scrolled sheets (operating with idle strokes)

Double zig-zag sheet feeder

for straight-sided and scrolled sheets (operating without idle strokes)

Straight-sheet or coil feeder

The Servodrive roll feed mechanism guarantees measured precision feeding

The roller feed mechanism is controlled by servomotors that generate highly precise advance movements with accurate, non-cumulative positioning.

A digital servo controller ensures feed profiles with optimum acceleration, enabling smooth, non-slip acceleration for thin materials.

Sheet alignment

Sheets are centered by alignment wedges at the scroll. Straight-sided sheets have three-point alignment.

The END-O-MAT for double-row tooling is equipped with a roller feed mechanism at the infeed. This roller feed mechanism has been specially designed to process thin materials, with adjustable pressure and a pressure roller with optimized mass moment of inertia. High feed precision and, consequently, the smallest possible web width are achieved by means of a precisely ground feed-controlling upper roller and a highly-dynamic servo-drive. The drive is controlled by an intelligent, fully digital servo-control which allows acceleration-optimized feed profiles to be set. The relatively thin sheet can thus be accelerated, decelerated and positioned smoothly and without jerks.

This feature is of special importance for conveying of the sensitive scrap skeleton in particular. Therefore the roller feed mechanism at the discharge is of similar design, but with special emphasis on careful transport of the scrap skeleton. The feed precision of both roller feed mechanisms is better than 0.05 mm.

Flow of material through the END-O-MAT with double-row tooling:

Some advantages and specific features of the process are best described by describing the flow of material through the END-O-MAT.

A linear feeder, which is controlled by a servomotor, lifts the uppermost sheet from the stack by self-regulating suction units and transfers it to the point of infeed. Alignment wedges centre the sheets at the scroll. Correct alignment is monitored by proximity switches. Alignment at the scroll does not require the sheets to be of exact width and has a higher tolerance of deviation from angularity. Sensors are monitoring the alignment. In case of misalignment, the machine automatically carries out two more alignment attempts. If correct alignment of the sheet is still not possible, the machine is stopped and displays a fault alarm.

A double sheet detector and a sheet lacquering monitor system are part of the scope of supply. Detection of double sheets or any faulty lacquering on the top or bottom side of the sheets causes the controller to stop the machine to avoid scrap or damage to the tooling. The lacquering monitor system can be switched off if unlacquered sheets are to be processed.

To compensate for sheet length variations the machine is supplied with a sheet length compensation system. Sensors measure each sheet. The measured dimensions are compared with those of a reference sheet and provide the data required for correction of the clock-controlled infeed steps. The maximum permissible deviation in sheet length is 1 mm, approximately. In case of larger deviations, the controller stops the machine and displays a fault message. As soon as the scrap skeleton reaches the roller feed mechanism at the discharge, this mechanism takes over the clock-controlled transport of the sheet through the tooling and finally ejects the scrap skeleton. Operation without idle strokes is a must for high productivity. As soon as the roller feed mechanism at the infeed has handed over the sheet to the feed mechanism at the discharge, a new sheet is aligned, taken over by the roller feed mechanism at the infeed and accelerated so that it catches up with the preceding sheet at the centre of the tooling. A stepped sheet guide plate ensures that the sheets overlap as required for production without idle stroke.

Zigzag sheet feeder

A two-/ four-axle drive powered by a linear motor guarantees gentle precision infeed

With the zigzag sheet feeder, coordinated traverse movements along the x and y axes are controlled by linear motors, which generate high-precision advance movement. After alignment, the sheet is clamped only once and not released until the whole stamping process has been completed. The double zigzag feeding system's second x / y axis infeed operates alternately to the first x / y axis, which effectively eliminates the idle stroke.

The END-O-MAT for single-row tooling is equipped with one zigzag sheet feeding system at the infeed side of the stamping press. The version with double zigzag feeding system allows the machine to run without idle stroke (optional). The linear motors selected to drive the infeed mechanism are extremely dynamic and still practically wear and maintenance-free. Together with a direct digital position detection system they guarantee extremely accurate positioning of the sheets. The drives are controlled by an intelligent, fully digital servo-control which allows acceleration-optimized feed profiles to be set. The relatively thin sheets can thus be accelerated, decelerated and positioned smoothly and without jerks.

Each of the x-axes carries a gripper arm with pneumatically actuated grippers. The grippers are designed to form a slight impression on the sheet. This mixture of interlocking and frictional clamping of the sheets ensures its smooth passage through the tooling. The clamping procedure of the grippers is monitored by sensors. The double feeding version for production without idle stroke has an integrated lifting system so that the gripper arm can pass each other.

A roller feed mechanism ejects the scrap skeleton at the outfeed side of the stamping press. The draw-out rollers rotate at constant speed and are pneumatically closed to grip and eject the scrap skeleton. The slide itself actuates the end ejection kickers mechanically by means of cams. The kickers can thus be set easily and damage to the tooling is avoided. To ensure optimum dynamic behaviour, the material selected is ultra-light high-strength carbon fibre.

Flow of material through the END-O-MAT with single-row tooling:

Some advantages and specific features of the process are best described by describing the flow of material through the END-O-MAT.

A conventional sheet feeder lifts the uppermost sheet at the front end from the stack by suction units and transfers it to the transport rollers of a motor-driven roller mechanism. As an option this roller mechanism can be replaced by a lubricating system. The roller mechanism or the lubricating system transports the sheets onto an alignment table with conveying belts where they are aligned with a three point system. Sensors are monitoring the alignment. In case of misalignment, the machine automatically carries out two more alignment attempts. If correct alignment of the sheet is still not possible, the machine is stopped and displays a fault alarm.

A double sheet detector and a sheet lacquering monitor system are part of the scope of supply. Detection of double sheets or any faulty lacquering on the top or bottom side of the sheets causes the controller to stop the machine to avoid scrap or damage to the tooling.

To compensate for sheet length variations the machine is supplied with a sheet length compensation system. Sensors measure each sheet. The measured dimensions are compared with those of a reference sheet and provide the data required for correction of the clockcontrolled infeed steps. The maximum permissible deviation in sheet length is 1 mm, approximately. In case of larger deviations, the controller stops the machine and displays a fault message.

As soon as the sheet is aligned correctly, pneumatically actuated grippers grip the outer corners of its trailing edge. Coordinated traverse movements along the x- and y-axes of the zigzag feeding system during the opening strokes of the stamping press then move the sheet through the tooling. A typical feature of the END-O-MAT feeding system is the fact that the sheet is clamped only once and is not released until the whole stamping process has been completed.

The second x-/y-axis infeed system of the double zigzag feeding system has by now returned to the alignment table and has taken over the next sheet after it was aligned. To ensure that both gripper systems can pass each other without colliding the returning gripper arm is raising by a lifting system.

The ejection roller mechanism at the discharge closes after the last stamping stroke and takes over the ejection of the scrap skeleton. As soon as the tooling closes for the last stamping stroke, the clamping grippers are opened and the gripper arms return to take up a new sheet.

The ends leave the sheet conveying level when the slide performs its downward stroke and are ejected by mechanical kickers. For optimum accessibility from each side of the tool, the kickers are centrally mounted on a common shaft. Each individual kicker can be displaced lengthwise and can easily be adjusted in height and position in relation to the tool.

Having been ejected from the tooling, the ends are taken over by magnetic conveyors which reach directly into the tooling. These cross conveyors remove the ends from the tooling area and deposit them on joint magnetic conveyors, one each arranged in front of and behind the tooling area. These magnetic conveyors are positioned below sheet level. To avoid problems caused by ends which have not been ejected from the tooling, each end is monitored by a discharge monitoring system with light sensors. If an end is missing, the controller stops the machine and indicates which tool failed to eject its end.

End ejection

Flat steel ends can be ejected mechanically by one of two safe, simple methods: kicker ejection or end discharge.

With the kicker ejection system, as its name suggests, ends are ejected from the tools by kickers and fed out of the die area on belts, ensuring that the production process for the various types of end design proceeds reliably. The system requires no additional energy (air) for ejection and can be easily adjusted for other end sizes. Ejected ends are spaced equally, which ensures safe entry into the curler. Light sensors monitor the ejection process and also count production runs.

When the end discharge system is used, the END-O-MAT stamping press is connected to the curlers or subsequent production units by discharge belts. Depending on the configuration of the production line, ends, shells or caps can be discharged in either one lane or up to four lanes per tooling row.

Tooling system

Multi-die tooling makes FEA-optimized end designs a reality.

Boosting productivity and product quality depends to a large extent on easy accessibility to tools and rapid die set change. The END-O-MAT's quick-lift function provides fast, convenient access to the die area at the comfortable height of 1400 mm (55"). Spring-loaded rollers, which lift the tooling from the slide plate once the fixing screws have been loosened, allow the tooling to be changed swiftly and simply by a single operator using a special tooling carriage.

END-O-MAT multi-die tooling

The individual tools are mounted on the column die set and centered at the manufacturer's plant. The centering rings are then fixed and secured against dislodging. The individual tools need not be recentered at the customer's plant - a fact that facilitates their easy replacement. Tool changes are further simplified by the fact that each toolset, this means both top and bottom tools, is fastened by one central screw. The tooling is provided with carbide cut edges to ensure a long lifetime. The approximate service life of the tooling is about 5 million ends for each individual toolset for unwaxed, chromium-plated DR material. The dies can be reground about 20 times with about 0.2 mm each so that about 100 million ends can be produced by each individual toolset. Lacquered sheets need not be greased or waxed for this type of tooling. With waxed or tinplated lacquered material the lifetime can even be two or three times longer!

Sheet holders, blank holders and ejectors are powered by compressed air or nitrogen. There are no mechanical springs with their typical problems. The forces for the above elements can be set from outside by means of pressure regulators.

The stamping press has been designed with fast tool changeover in mind. The complete tooling can be pulled out of the machine through an opening in the narrow side of the press. Spring-loaded rollers which lift the tooling from the slide plate once the fixing screws have been loosened allow the tooling to be pulled out easily on a simple change carriage. Then the new tooling is pushed from its carriage onto the slide of the stamping press. Index pins in the bed of the stamping press ensure correct positioning of the tooling in the press. Manual alignment is not required. Once the kickers have been set, sheet centering has been checked and a new program has been retrieved from the controller the stamping press is ready to resume operation. Replacement does not take longer than about 30 minutes; the time required for diameter changeover is less than 1 hour, with trained staff.

Standard tooling.

Thanks to cantec's Innovative one-stage tool design, canmakers can rely on a Standard tooling system for all common and non-critical ends and shells.

During can end production, it is crucial that the material is not stretched in the beads, in the countersink inclination or in the countersink radius because this could weaken the material and damage the tin and lacquer coating. It is achieved by ensuring that the force required to clamp and hold the blank does not increase as the tool closes.

Cantec tools are carbide-tipped for a long service life and the cutting ring can be reground several times. Individual tools can be removed quickly and easily – changeover time for a complete tool is approx. 30 minutes. They are pre-centered and secured by a single central screw, eliminating the need for additional tool centering after tool replacement.

The production process is equally simple. The system draws ends in one step and is suited to easy profile geometries on SR and DR material, with limited downgauging and thinning of less than 10%. There are no mechanical springs for the ejector blank holder and stripper ring, and the tool is operated by compressed air pressure.

Multi-stage tooling

Cantec's multi-stage tool is the system of choice for critical shells.

The production sequence consists of cutting the blank, drawing the inner panel in several stages (the number of stages depends on the profile), and forming the countersink without tensile forces from the inner geometry. Production of top and bottom ends is geared to optimum performance as regards buckle, distension, vacuum pull back, and lacquer-preservation in material grades from SR material to the hardest DR material (in the latter case, twisting is reduced to a minimum). The thinning of material in critical areas is minimized to under 4% and stress likewise minimized for the tin and the lacquer application.

Thermo-compensated tooling system

Cantec's thermo-compensated tooling system was designed specifically for critical sanitary ends.

The production sequence consists of cutting the blank, drawing the inner panel and forming the countersink depth. The end is already in its final form before completion of the press stroke. Shells (mainly easy-open types) and bottom ends with narrow tolerances are manufactured in all material grades, from SR to DR. The end dimensions are unaffected by changes in the temperature of the press and tool system. Tolerances for the countersink and panel offset are extremely tight, which guarantees consistent product quality for subsequent processing and ensures that the force required to remove an easy-open end is more evenly spread.

Multi-stage and thermo-compensated tooling systems can be combined in a single set-up.

Multi-stage thermo-compensated tooling system

the Cantec multi-stage thermo-compensated tooling system was designed specifically for critical sanitary ends.

The production sequence consists of cutting the blank, drawing the inner panel and forming the countersink depth. The end is already in its final form before completion of the press stroke. The process is suited to SR and DR materials, involves minimal thinning (less than 4%) and guarantees maximum end performance, even for SR materials. Tolerances for the countersink and inner panel are very close and the end dimensions remain unaffected by changes in the working temperature of the press and tool system.

END-O-MAT Accessories

the END-O-MAT system includes a range of Optional extras that make all the difference to your budget

Tool-changing carriage for smooth handling

The tool-change carriage allows tooling to be removed and installed by just one person in a matter of minutes.

Remote diagnosis

Access to the machine controls via phone line facilitates checking the settings.

Sheet lubricating system

A spraying or rolling system is available for lubricating the sheets in special cases.

Oil temperature control

In extreme climates, this system heats and cools the oil to ensure constant oil and machine temperatures.