The Eumuco Hasenclever Closed-Die Forging Division of SMS Eumuco has a proud history in press manufacturing, leading from the classic forging press to today’s automatic forming system.

The wedge press is a closed-die forging machine which offers outstanding precision. Its key features are an extremely high longitudinal rigidity (frame elongation) and tilting resistance in all directions. The low elongation of the press results in short contact times under pressure.

Due to their high eccentric loadability and resistance to tilting, wedge presses are advantageously used whenever the parts to be forged are long and close thickness and mismatch tolerances are to be ensured over the entire length of the part. Typical examples include: twin conrods, truck front axles, crankshafts, precision forgings, etc.

The automated version of the wedge press can be operated both in intermittent and continuous mode depending on the requirements in hand and or the part to be produced.
STRUCTURE and FUNCTION PRINCIPLE

(1) Frame
SMS Eumuco attaches particular importance to solid frame construction, which offers considerable advantage over a split frame with tie-rods with regard to longitudinal rigidity and also resistance against tilting. We build machine frames of monobloc design in weights up to 185 t.

(2) Ram (3) Wedge / Pitman
The ram is driven by a wedge which is moved horizontally between machine frame and ram by crankshaft and pitman. The wedge has a large surface, thereby establishing a rigid connection between ram and frame. The plane surfaces of the wedge allow for a wide die space and avoid tilting of the ram by the amount of the guide clearance.

(4) Ram guide
In designing wedge presses, we pay particular attention to precise guidance of the ram. To meet the demand for a machine which is rigid in every respect, the wedge press is equipped with an 8-point guiding system in which the guiding faces are arranged at right angles to one another.

(5) Clutch / Brake System
A reliable clutch/brake system ensures short engagement/dischage times. The clutch and brake are directly connected to the crankshaft to protect the press against overload. The clutch/brake system can be controlled either electro-pneumatically or electro-hydraulically. Both the easy-to-service single-disc block clutch and the brake arranged on the opposite side are fitted with easily replaceable asbestos-free friction pads.

(6) Weight counterbalancing equipment
For dynamic balancing, the weight of the up- and down-stroking press components, including bolster and dies, is compensated by varying air pressure generated by two pneumatic cylinders. This minimizes the bearing clearance of the components arranged in the force path, thereby positively influencing the impact loading of the press elements directly involved and the precision of the forged parts.
(7) Ram adjustment system
The ram adjustment system allows the height of the die space to be adjusted in order to set up the forging dies and to compensate for temperature differentials and die wear. The stroke position of the ram is adjusted by means of a motor, with the eccentric bush housing the pitman being rotated by means of a worm drive. In automatic operation, the patented ram adjustment system is activated between two strokes. In case of trend messages reporting varying workpiece weights, forging forces, workpiece dimensions, etc. the stroke position of the ram can be automatically re-adjusted in a closed-loop control circuit.

(8) Backgear / (9) Herringbone gearing
Wedge presses are available in versions with or without backgear depending on the required machine size. In machines with backgear, the drive torque is transmitted by a closed herringbone gearing of the main drive. This type of gearing ensures smooth operation.

(10) Top and bottom ejectors
Wedge presses are equipped with controlled top and bottom ejectors. These systems help considerably to stabilize the process, especially in fully automatic forming units. The ejectors must position the workpiece at the precise point and time required for pick-up by the monitored grippers of the walking beam transfer system. In the process, the ejector must also ensure that the forged workpiece remains on the bottom die when a return stroke of the press ram is realized. The standard ram ejector system is designed in such a way that the workpiece is held down in the bottom die during ejection. The ejector movement is synchronized with the ram movement. The main forming stations in the bottom bolster are equipped with individual ejectors which are arranged in the press table. These can be operated either hydro-mechanically or servo-hydraulically. The actual ejector stroke sequence will depend on the type of part to be forged and the different forging operations. The strokes and also the start and hold-up times can be set at the control desk of the plant. To cater for different applications, various ejector systems are available, which are optimally tuned to the requirements.

Lubrication system
Lubrication is geared to the needs of each machine type, allowing for flexible programming of the lubricant input. The central grease lubrication system is subdivided into function groups, each of which is monitored electrically. There are consequently different lubrication cycles and varying lubrication intervals e.g. for crankshaft and pitman bearings, ram guide and gear wheels. Furthermore, all vital bearing points in the machine are fitted with thermal sensors which warn of excessive temperature. If desired, the machine can also be fitted with an oil lubrication system.
INDIVIDUAL COMPONENTS

FRAME
- Solid monobloc cast steel design in transport weights up to approx. 185 t
- Broad, high side-windows in all frames for the feeding of the forging blanks and evacuation of the finished part or the flash respectively

WEDGE / PITMAN
- Broad, rigidly connected double pitman made of cast steel
- Wedge with shoulders at top and bottom for form-fit connection to the frame (top) and the ram (bottom), ensuring absorption of pullback forces
- Wedge with hardened top and bottom surfaces, grease lubrication via distributors arranged at the front face
COMPONENTS

AUTOMATIC ELECTRIC WALKING BEAM TRANSFER SYSTEM
- designed for an operating speed of 30 strokes per minute
- consisting of four single housings with drive unit, attached to the press frame
- including two interchangeable walking beams with their own separate drives
- 3 motion axes
  - “transfer step”
  - “lift/lower”
  - “open/close”
each axis driven by a separate servo-motor

For further information, please refer to our leaflet “EHA”.

HYDRAULIC CLUTCH / BRAKE SYSTEM
- oil-immersed
- short response times
- good heat exchange
- low noise level
- low wear
- minimum maintenance

For further information, please refer to our leaflet “HKB”.
SPRAYING PATTERN
(spraying volume distribution)
Comprehensive concepts for machines and processes through
- safeguarding and optimization of spraying sequence
- field-oriented studies on test set-ups (e.g. spraying test station)

HANDLING ROBOT
- Eumuco Hasenclever robots, MEE type
- integration of industrial robots
CONTROL SYSTEM

The complete function control and monitoring of the machine and supplementary equipment is ensured by the SMS Eumuco press safety control EPSS. This control has been designed in accordance with the latest, legally binding EN standards and German accident prevention regulations (UVV) and, therefore, offers a maximum of safety for the operating personnel.

The configuration is based on safety hardware combined with a standard PLC and offers maximum flexibility also for a later automation of the machine (fence guard, external stroke release / interfaces, visualization, networking). The machine visualization system, PICOS runs on industrial PCs and has a well-designed and intuitively operable flat screen displaying the following information:

**OPERATING STATUS**
Overview display of readiness for operation:
- control CPU
- control voltages
- mode selector switch
- sensors
- hydraulics
- main drive
- motion enabling
- press safety circuit
- machine readiness

**MEASURED VALUES**
Display of measured values of the machine:
- ram position
- ram adjustment
- bearing temperatures
- press forces (cumulative or, as an option, additional indication of total forces on left and right side)
- workpiece counter
- stroke counter
- flywheel speed and motor current (only for versions with converter)

**MACHINE PARAMETERS**
Input of machine parameters:
- spraying and blowing times
- activation of ejectors and ejector function
- ejector strokes
- lubrication parameters
- storing of machine parameters as recipes
- display of alarms and alarm data bases
- operation on several password levels

Additional options available with the extended version PICOS++:
- BDE: Operating data acquisition
- REP: Reporting system
- FIS: Fault information system
- ISS: Maintenance and repair system
- REM: Remote access system (Teleservice)
- PPS: Production planning and control interface
- HSP: Status displays for hydraulic, lubrication, and pneumatic systems
The press drive is designed as:
- three-phase asynchronous slip ring motor
- three-phase asynchronous squirrel-cage motor

As an option, we also supply a version with frequency converter. The main advantages in this case are energy-saving and motor-friendly operation as well as reliable multiple starting within a short period. In this version, a three-phase asynchronous motor of the squirrel-cage type is used. The standard motor with a high degree of protection is maintenance-free.

Moreover, the operating speed is preselectable within a range of 80-100% as well as the set-up speed of approx. 10%. The latest-generation converter uses digital signals and is linked to the PLC via Profibus.

For further information please refer to our control leaflet.
No matter what the forging task – connecting rods, crankshafts or other precision forgings – our wedge presses unite traditional forging techniques with automated industrial manufacture – for precise, productive, and cost-effective results. Here are just a few examples from the extensive range of wedge press applications.
# FACTS about the Wedge Press

## AT A GLANCE

### STANDARD BASIC DESIGN
- Monobloc frame in transport weights up to approx. 185 t, 4-piece tie rod design for higher weights
- Ram guiding with bronze gibbs, adjustable
- Motorized ram adjustment
- Pneumatic block-type clutch and brake
- Pneumatic weight balancing system
- Flywheel brake
- Mechanical top ejectors for three operations
- Hydro-mechanical bottom ejectors, operated by thumb shaft, for three operations
- Sound-proofing hoods
- Grease or oil lubrication
- Complete installation
- Electric control system
- Hydraulic unit (for mineral oil)

### OPTIONS
- Low-wear table and ram coat welding
- Ram lock
- Ram guiding with nitrided gibbs, adjustable
- Ram quick-adjustment device
- Ram releasing device
- Hydro-electric clutch/brake system
- Additional/hydraulic top ejector
- Bottom ejector, motorized stroke adjustment
- Bottom ejector, individually operated and with motor adjustment
- Bearing temperature monitoring
- Press force monitor
- Smoke extraction hood
- Grease refilling device
- Hydraulic unit (for fire-resistant HFC fluid)
- Frequency-controlled drive
- Oil circulation lubrication, closed-circuit

### OPTIONAL EXTRAS
- Tools/dies
- Bolsters
- Die and/or bolster quick-clamping system
- Die changing systems
- Bolster change carriage
- Turnover device
- Workpiece handling systems
- Spraying device
- Customized electronic control
- Foundation frame (vibration proof)
- Assembly platforms, protective grids
SMS Eumuco: Your partner with ideas and profile to match

SMS Eumuco wedge presses for closed-die forging operations are precisely geared to your requirements. You can choose from an extensive range of performance parameters to make all components match perfectly, both technically and economically.

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Our divisions:
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- Schloemann Extrusion Division
  INNSE Extrusion Division
  SUTTON Extrusion Division
- Wagner Banning Ring Rolling Division
- SMS Eumuco Cold-Finishing Division
  Landgraf Cold-Finishing Division
  SUTTON Cold-Finishing Division

Subject to change due to technical improvements!