SMS group

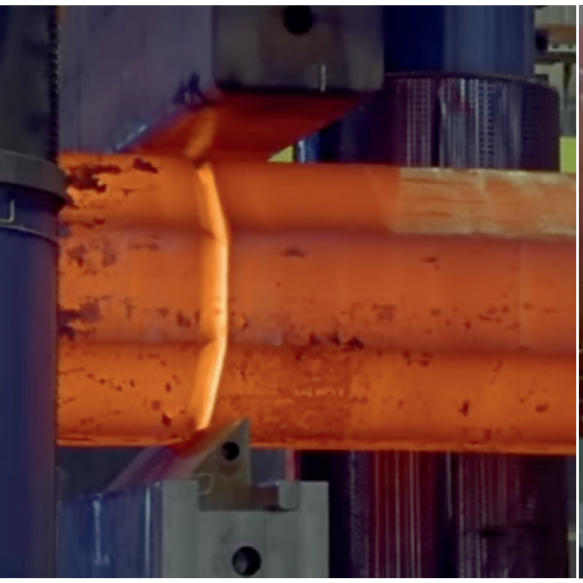
Open-die forging plants

Tailormade solutions




Open die forging

Real market advantages through a strong partner



Nothing runs without power – life comes to a standstill. Today's world is dependent on the smooth running of modern power plants. The core of these systems is formed by turbines and generators, which are driven by shafts – shafts that are produced by SMS group through open die forging.

Extensive portfolio

The demands on the market for forged products are high. Depending on the particular need, SMS group offers various production processes in order to meet these high requirements. A system consists of one forging press and one or two rail-bound manipulators. Together, they offer high production speeds, small forging tolerance values and a constantly high quality level – core elements of every process which provide SMS group's customers with a significant competitive advantage. Furthermore, SMS group takes the particular certification requirements which a plant operator has to fulfil for products in such sectors as energy, transportation, air and space travel into account.

SMS group's experience is your advantage

SMS group has more than 140 years of experience manufacturing machinery and plants. It was Carl Eberhard Weiss who in 1871 laid the foundation for the present-day company in the form of a forging business. Today, SMS group is one of the leading companies worldwide in the field of forging and press products and offers individual, powerful press solutions in every area. The portfolio ranges from hydraulic open die forging presses and radial forging machinery through extrusion presses and drop forging to ring roll-

Experience, innovation and references

- More than 140 years of experience
- More than 6,300 forging systems – including 1,430 hydraulic presses
- Innovation strength:
  - Handling of 600 t block weight (and more)
  - High speed even with high MN values
  - Highly complex and individual alloys possible
  - Complete process administration incl. data storage

ing plants. As of today, almost 6,300 forging systems have been built – including 1,430 hydraulic presses. A special highlight is one of the largest open die forging systems in the world: the Saarstahl plant with a pressing force of 12,000 t.

Progress for the benefit of the customer

Heavier block weights, faster reaction times, flexibility with respect to the alloys and collection of data – current market requirements require rethinking during the production and operation of open die forging.

In this way, SMS group ensures that forging block weights of 600 t can be handled well in the future too. Speed is a great asset at SMS group: 80 MN presses currently manage 80 strokes/min and will be even faster – just like their little sisters. Highly complex alloys do not represent any obstacle for SMS group, because: crack-free forging is not a question of the alloy but rather of the technology. Repairs and maintenance are easier if the relevant data is systematically stored over time – SMS group helps here.

SMS group has the customers' rising requirements in view and continuously develops customised solutions to meet the market situation. A new generation of products can be manufactured using progressive forging techniques, which withstand higher temperatures and pressures and thereby raise the energy yield. The modern system concepts enable reproducible quality and guarantee a high level of operational reliability. This provides plant operators with measurable advantages on the market.

Forging press portfolio

Push or pull

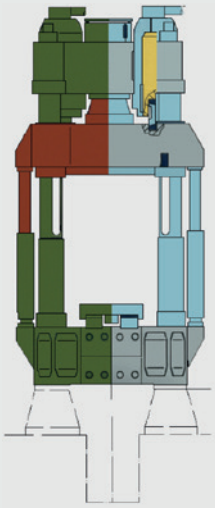
Push-down type forging presses
SMS group push-down type forging presses are recommended where the soil conditions do not allow for a large foundation depth and the building height is sufficient for the relatively large overall height of the press above the floor. They offer the advantage of low moving masses resulting in a more economic use of energy at high stroke rates. All hydraulic cylinders and guide parts are easily accessible, thus reducing maintenance costs. They can be driven either by oil-hydraulic or water-hydraulic pumps.

The two-column and moving cylinder presses are built for small and medium press capacities, while the four-column design is preferred for high press capacities.

Pull-down type forging presses
SMS group pull-down type forging presses are the solution if the building height is not sufficient for the overall height of the required press capacity. They also offer the advantage that all hydraulic cylinders are arranged under floor so that leaks cannot come into contact with the hot forging, thus reducing the danger of fire hazards with oil-driven presses. They can be driven either by oil-hydraulic or water-hydraulic pumps. Their centre of gravity is close to the press anchoring point, reducing press vibrations.

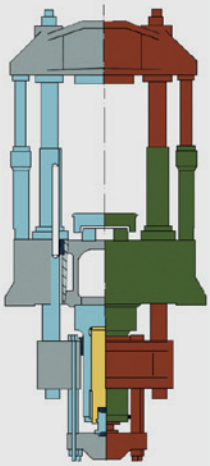
Two-column presses offer better visibility of the forging area. The two-column presses are built for small and medium press capacities, while the four-column design is preferred for high press capacities.

Push-down type forging presses



Static parts
Moving parts

Pull-down type forging presses



Static parts
Moving parts

Auxiliary equipment

All SMS group open-die forging plants are equipped with advanced auxiliary equipment to facilitate and ease forging operations, die changing and transportation. They comply with the individual requirements of our customers. We deliver:

- Table shifting equipment
- Tool sliding devices
- Top die turning and clamping devices
- Ejectors
- Tool magazines
- Ingot turning cars
- Devices for partial forging of disks
- Integrated punching devices
- Centering and lifting devices
- Swivel arms
- Charging and discharging devices

Modernisation and updating

Looking back over the years SMS group has received numerous orders for conversions, modernizations and extensions. These projects resulted in broader product ranges, and new processes were made possible. There are many approaches to modernization:

- Converting water-hydraulic presses to oil drive saves forging time and energy costs
- Remote-controlled die changing devices cut idle times
- Ingot cars, turning and swiveling devices or lifting turntables shorten charging times
- Manipulators can follow control signals more accurately than cranes
- Updated controls optimize forging precision, allowing integration, automation of press and manipulator(s), as well as program control as per precalculated pass schedules

Rail-bound manipulators

Handling heavy weights

SMS group rail-bound manipulators can easily handle weights up to several hundred tons. They guide and position the forging precisely under the press tools. They are oil-hydraulically driven and electronically controlled. Press and manipulator motions are integrated and controlled by one operator from a central pulpit.

For very high production rates of rods and bars, especially of high-alloy qualities which can only be forged in narrow temperature ranges, we recommend the two-manipulator operation. This offers the advantage that the hot stock can be forged over the whole length without turning on a rotary table.

Typical characteristics of SMS group manipulators are:

- Simple and straightforward construction – all maintenance parts are easily accessible
- Precisely controlled parallel stroke of the tongs in synchronisation with the press strokes by means of independent control
- Integrated horizontal correction for the controlled return stroke of the tongs into the precise centre position in synchronisation with the press strokes
- High-performance drive with oil-hydraulic motors, gears and drive shaft in the foundation
- Individual drive for each drive shaft wheel
- Drive gear as a complete unit, easy to dismantle for overhauling

Radial forging machines SMX

Pioneering technology

SMS group hydraulic radial forging machines with their tools arranged in an X-formation represent an extremely efficient method of forging. Specifically, they open up new prospects for the individual and series production of semifinished bars and complicated, longitudinal pieces. Added to this is top achieved with uniform core shaping.

Typical characteristics of SMX are:

- Precise, flexible and cost effective due to pressure from all sides
- Uniform core shaping for excellent quality
- Three to four times greater forging performance than comparable forging presses
- Flexible adjustable die for multiple shapes and tubes
- Axial material flow, eliminating spread
- Low maintenance costs
- Low spare parts costs
- Fine grain forging of TI and NI-based alloys

Forgecontrol

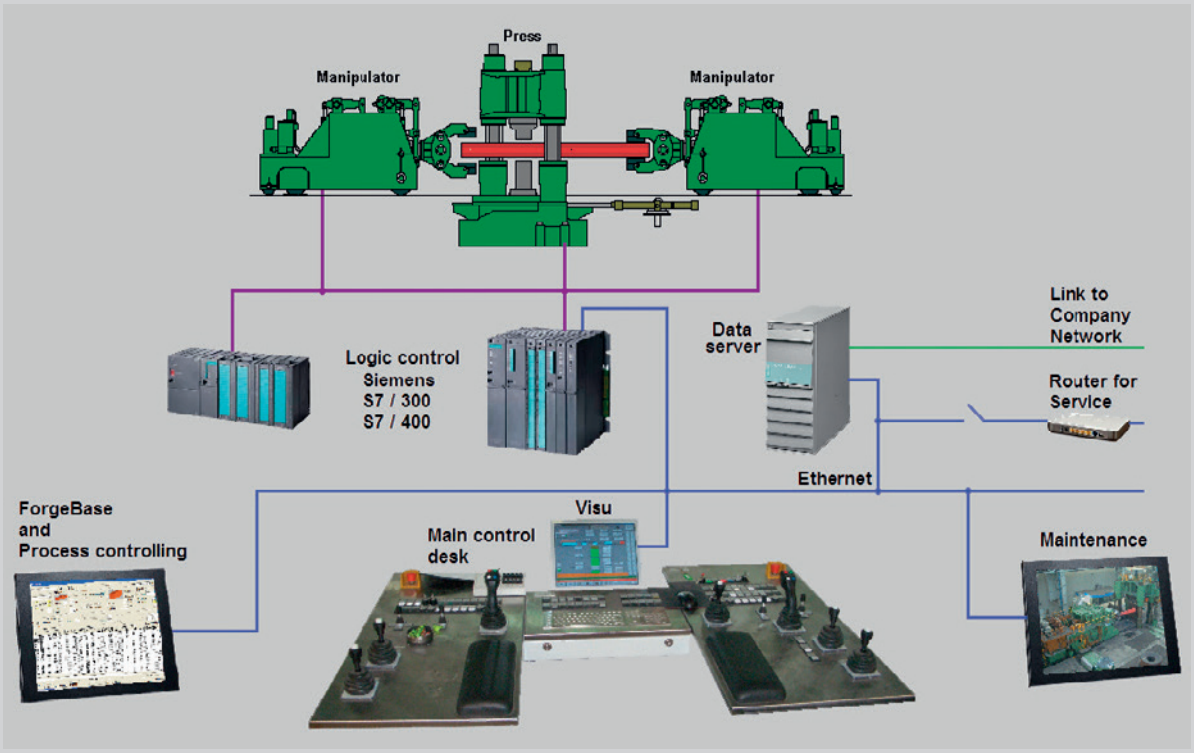
Integrated system

Forging press drives

Any local condition requires individual solutions not only for the press type but also for its drive. It is for this reason that SMS group offers both oil-hydraulic and water-hydraulic drive systems. Available at relatively low investment costs, the oil-hydraulic drive is particularly suitable for small and medium-sized presses. The direct oil-hydraulic pump drive is supplied as a tested module and fixed to the tank in the package type of construction.

Alternatively, it is mounted as an individual installation on the foundation. Using this drive offers the advantage that the plant parts are subject to low wear and are well protected from corrosion. The accumulator drive with water is used for driving large push-down forging presses. This coincides with new developments which have helped to focus attention on the water-hydraulic drive. What could be better than this approach, combining economy, technology and environmental safety?

Forge Control System



Integrated control of press and manipulator(s)

Irrespective of the kind of hydraulic drive (oil or water), the forging press and the rail-bound manipulator(s) are controlled by servo and proportional valves to ensure smooth press motion and its shockfree return to the upper and lower reversal point. The corresponding electronic control permits manual, semi-automatic or fully automatic operation of press and manipulator(s) from a central control desk, located in a cabin insulated from heat, dust and noise.

Semi-automatic or fully automatic press operations can be interrupted and changed to manual at any time. By using our ForgeBase control system, forging operations can be executed as per pre-calculated pass schedules with maximum precision, speed and cost-effectiveness.

The major advantage of precalculated pass schedules is the repeatability of the forging process, independent of the forging operator, minimizing the variations in the process. Optimization with regard to forging time and process can be easily attained through online data acquisition and nominal value/actual value comparisons of the process data.

Innovative dynamics also means combining top technology with modern electronics, because control and calculation are decisive steps in economic, rational operations. Whatever your needs, SMS group supplies solutions for all the tasks involved in modern forging technology.

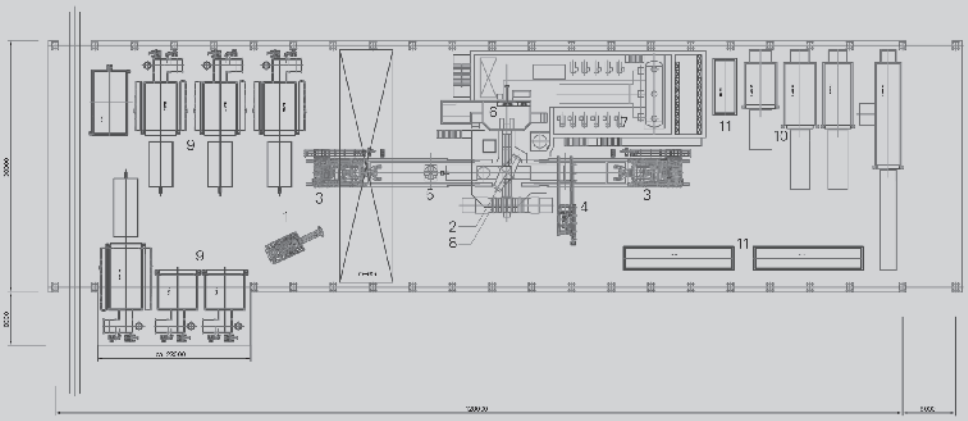
All the systems we supply have been developed by our experts and are continuously updated. This is where we see part of our core competence – teaming up with customers to create instruments for the effective monitoring and control of the production process. Last but not least it also serves as a basis for constant improvements in work plans.

Plant engineering

A wide range of solutions

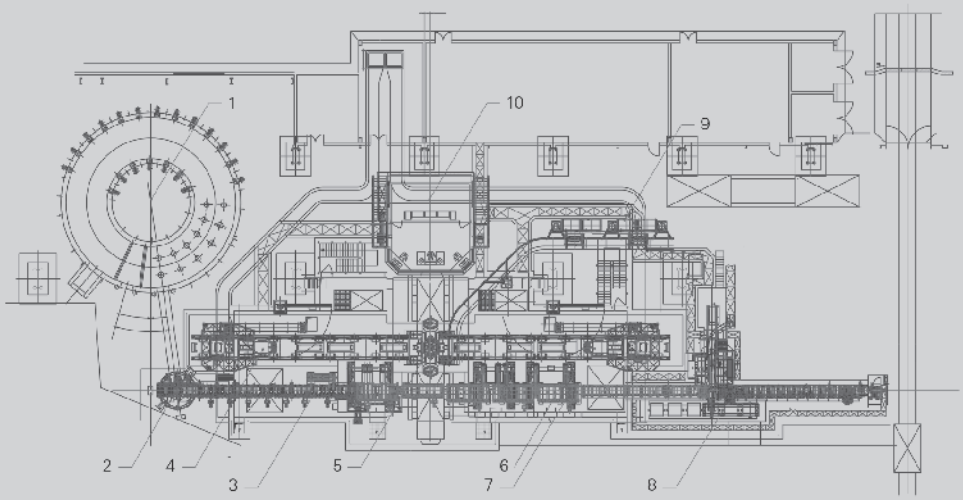
SMS group plans and builds complete forging plants, including ingot heating facilities, annealing furnaces, cranes etc. in cooperation with specialists to whom long-standing business relations exist. Typical plant layouts which have been realized in recent years are shown below.

Open die forging layout with two forging manipulators



1 Tongs charging machine
2 Open die forging press
3 Rail-bound manipulator
4 Rotary table
5 Lifting rotary table
6 Control cabin
7 Drive cellar
8 Die magazine
9 Forging furnaces
10 Annealing furnaces
11 Quenching bath

Radial forging machine SMX layout



1 Rotary hearth furnace
2 Rotary table
3 Roller conveyor (loading section)
4 Manipulator (loading section)
5 Radial forging machine SMX
6 Manipulator (unloading section)
7 Roller conveyor (unloading section)
8 Cutting unit
9 Tool exchange system
10 Control cabin


SMS group

Our product portfolio

Always the right service for you

Whatever you are looking for – whether spare parts, modernizations, tailor-made maintenance, or special training courses – SMS group Technical Service is there for you ... available at 50 locations worldwide to offer you effective service packages ... designed to optimize your operations along the entire metallurgical process chain. You benefit from the collective know-how of a powerful group because our employees match services precisely to your wishes and implement them on schedule, on budget, and based on the quality you want.

That means: you can rely on the quality of our services as well as a fast response with a personal touch. All this to cut downtimes, boost your productivity, and ensure the sustained value of your machinery and plants.

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