



## Special Purpose Machinery For the Forging Industry

# Company Introduction



Group Rhodes offers 190 years of experience in the manufacture of special purpose mechanical and hydraulic presses for metalforming applications around the world.

All major research and development work is conducted in-house and is supported by a well-equipped Computer Aided Design Department covering mechanical, electrical, hydraulic and software engineering disciplines. The company operates from four sites in the United Kingdom, and boasts excellent fabrication, machining and fitting departments. All aspects of machine build are controlled to Rhodes quality and safety standards which have achieved international (ISO) and European (CE) certification.

The Company actively manufactures and markets over fifty basic product ranges, although pride is taken in the ability to design, develop and manufacture bespoke machinery and complete turnkey solutions.

**Main (left):** Aerial photograph of the Company's 30 000 sqm head office site in Wakefield and other UK sites.

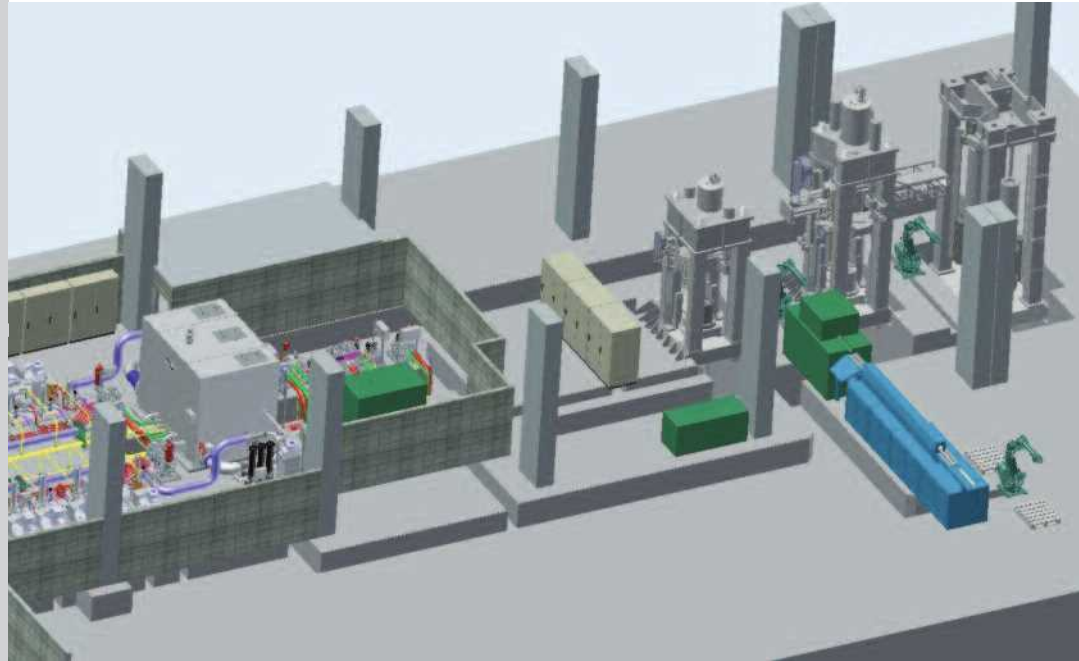
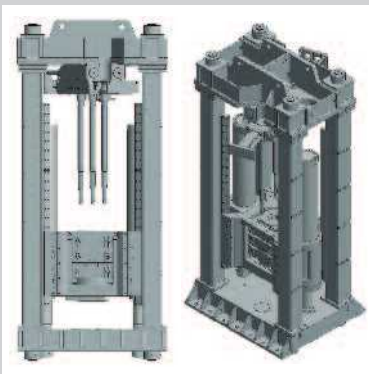
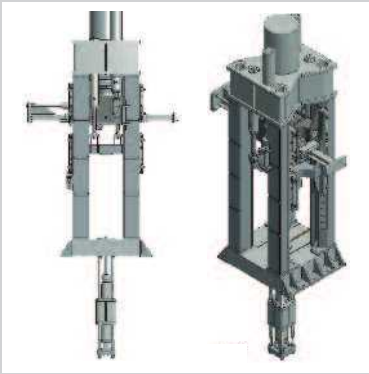
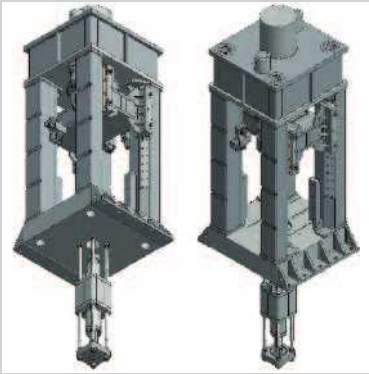
**Top:** Group Rhodes has a comprehensive machining facility which can accommodate components weighing up to 40 tonnes.

**Bottom:** The technical design department utilise Autodesk Inventor, Solid Works, and CATIA 3D design packages

**Below:** The fabrication division offers TIG, MIG and MMA welding to ISO1561-1 + ASME 9 standards; Flame Cutting; Shot Blasting; Stress Relieving and Sub Arc Welding.



# Hot Forging Line



The Forging line is capable of producing 60 shells per Hour.

The line consists of:

1. De-palletising robot
2. Induction heater capable of heating a billet up to 1300 Deg Cen
3. External de-scaling unit
4. 2 Transfer robots
5. Upsetting Press
6. Piercing Press
7. Internal de-scaling unit
8. Draw Press

**Main (right):** Schematic layout drawing of the complete Rhodes Forging Line.

**Left (top):** 600 tonne down-stroke hydraulic Upsetting Press

**Left (second):** 1000 tonne down-stroke hydraulic Piercing Press

**Left (third):** 400 tonne up-stroking hydraulic Draw Press

**Left (bottom):** Rhodes Forging Line under construction in the Wakefield head office

# Upsetting & Piercing Presses



## Upsetting Press

600 tonne down-stroke hydraulic upsetting press, capable of forming a billet from cut bar up to 155 mm in diameter. The press produces a defined dimensional billet to the correct length and diameter.

*Key press features include:*

- A main down-stroking cylinder
- Two return cylinders
- Tool die container
- Fabricated frame with tie rod and column construction, (pre-stressed design for extreme rigidity).
- Accurate gib guiding for all moving slides with self-compensating clearances
- Double acting ejector

## Piercing Press

A 1000 tonne down-stroke hydraulic piecing press takes the upset billet, and forms a cup shaped 'bottle'.

*Key press features include:*

- Twin independently controlled moving slides. The first is for pressing and the second is used to strip the formed billet from the punch.
- A main down-stroking cylinder
- Two return cylinders

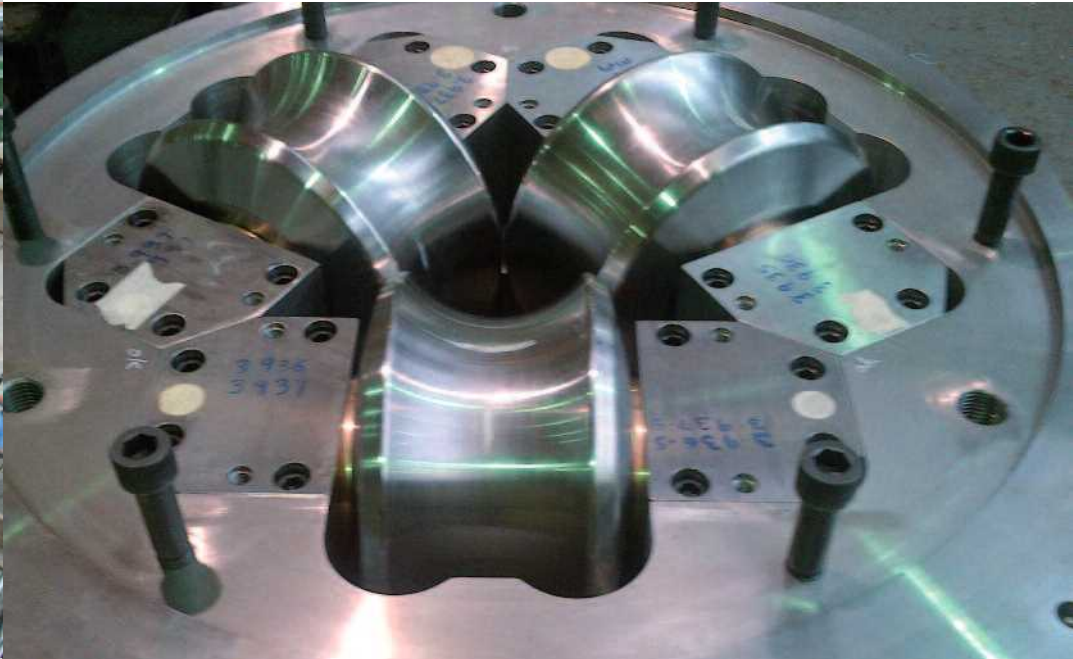
**Main (left):** Rhodes Piercing and Upsetting Presses under construction

**Above:** All 3 Rhodes Forging Presses are of fabricated frame with tie rod and column construction

**Below:** The Piercing Press includes 3 position tool slide



# Draw Press



**Main (right):** Draw Press roller dies

**Above:** The Rhodes Draw Press includes 2 main double acting cylinders

**Below:** Rhodes Draw Press under construction



## Piercing Press (continued...)

- Two double acting stripper cylinders
- 3-position tool slide (reduces tool change downtime).
- Tool die container
- Fabricated frame with tie rod and column construction, (pre-stressed design for extreme rigidity.)
- Accurate gib guiding for all moving slides with self-compensating clearances
- Double acting ejector
- Accurate alignment of the punch and container by providing a stripper / punch guide tube

## Draw Press

A 400 tonne upstroking hydraulic draw press takes the pierced billet and 'draws' it to its final length and diameter

*Key press features include:*

- Two main double-acting cylinders
- Moving slide complete with 3 stage roller tooling for increased service life and improved accuracy. Final die ring sizing to produce an accurate good finish outside diameter
- Stripper assembly.
- Fabricated frame with tie rod and column construction (pre-stressed design for extreme rigidity.)

# Hydraulic System & Robotics



## Hydraulic System

- Eleven 355KW pumps to operate all three presses
- Energy efficient motors
- Fully welded pipework to eliminate possibility of leaks
- 30,000 litre capacity oil tank

## Robots

The de-palletising and transfer robots are integrated into the forging line which includes the three presses and all ancillary heating and handling equipment

Each Robot is equipped with end of arm tooling (grippers) whose construction and protection is appropriate to a hot forging production environment.

The automated handling ensures labour cost savings, eradicates any human error, and ensures safer working practices.

## Induction Heater

- Heats cut to length billets up to 1300 Deg C
- 2 MW power to produce an output of 1 shell per minute
- Compact to ensure minimum floor space is required
- High precision temperature control capability

**Main (left):** Rhodes hydraulic system includes eleven 355KW pumps

**Above (top):** Rhodes robot supplied with thermal insulated jackets

**Above (bottom):** Rhodes de-palletising and transfer robots

**Below:** Rhodes hydraulic system



# Induction Heater & Descaler



**Main right:** Integrated induction heater and descaler unit

**Above:** The integrated induction heater has high precision temperature control capability

**Below:** Filter unit

## Induction Heater (continued...)

- Medium frequency water cooled capacitors and output bus arrangement
- Hardened roller in-feed chain conveyor with adjustable side guides to suit different billet sizes
- Twin opposed Heavy-Duty pinch wheel drive system complete with rugged gear box and variable speed drive mechanism.
- Variable Speed Drive
- Lost motion device - to stop the system in the case of billet jam or malfunction in the drive system
- Internal water cooling circuit with heat exchanger for power supply cooling to connect to plant water system

## Descaler

- Integrated with the induction heater to remove the build-up of scale created during the heating process
- High pressure water running at up to 250 bar
- Complete with pumps, filtration, water collection and re-circulation unit.
- Scale removal conveyor with collection bin
- Hardened roller in-feed chain conveyor with adjustable side guides to suit different billet sizes



# Rhodes Control System



**Left:** Upsetting & Piercing Presses  
**Right:** Main Operator Control Desk

## Rhodes Control System

- Main operator control desk located at elevated position to offer optimal view of the complete forging line.
- Siemens S7 control unit with touch screen HMI interface, to integrate and operate the complete forging line.
- Individual control stations local to each machine to allow manual override for tool setting and maintenance requirements.



Data provided in this literature is an approximate guide and shall not be contractually binding. The policy of Group Rhodes is one of continuous product development. The right to change specification and design at any time without notice is reserved. 0.1M/0714/A

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