



COMPANY CAPABILITY



SWANSON
INDUSTRIES™

Jarvie Engineering™



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COMPANY PROFILE

Jarvie Engineering Pty Ltd is a member of the Swanson Industries group of companies, founded in Newcastle in 1952 by Bruce Jarvie.

The company was originally a general repetition engineering workshop.

As an established leader in hydraulic and pneumatic cylinder manufacturing and repairing, Jarvie has an enviable track record in servicing underground coal, surface coal, ports, industry, contractors and equipment repairers.

As well as hydraulic cylinders, Jarvie provides comprehensive rebuild and overhaul services for a range of mining equipment, vehicles, industrial and agricultural equipment.

An extensive range of Fluid Power Systems and products supplement the manufacturing services on offer.

For customer convenience and fast response to emergencies, service exchange cylinders for many applications are available.

All stages of repair and manufacture are controlled in-house from cleaning and stripping items, machining, welding and fitting of parts, hard chrome plating or laser surfacing of wear parts, to final assembly and testing of the finished product.

With the help of qualified, experienced and long-term staff, Jarvie provides exacting customer service, technical support and quality assured products.

Jarvie Engineering Lambton office and workshop gained accreditation to the internationally recognised AS/NZS ISO 9001 quality standard in 1994, and certification has been ongoing to this date.

To respond to the changes in industry needs, Jarvie invests in ongoing research and development, including re-engineering of existing products.

Jarvie innovations (for over 60 years) have led to process improvements and enhancement to product quality.



ENGINEERING SERVICES

Jarvie Engineering Lambton office and workshop is a Quality Assured Company to AS/NZS ISO 9001 that provides manufacturing services and engineering sales support from its Newcastle location and sales and stockholding support from its Mackay warehouse.

Its modern manufacturing facility, offers a broad range of machining capabilities to provide timely and efficient service and support to New South Wales and Queensland clients.

Headquartered in the Hunter with a service centre in Mackay, Jarvie offers quality assured services that include:

- Hydraulic cylinder manufacture, repair & redesign
- Engineer welding & fabrication
- General & CNC machining
- Hard chrome plating
- Deep hole drilling & boring
- Laser alignment
- Laser cladding & surface alloying
- Fluid power sales & repairs
- AutoCad inventor

The experienced Jarvie team has extensive knowledge in the field of general fabrication and welding, laser technology and general machining and fitting.

Jarvie prides itself on the quality of workmanship, professionalism, ability to meet deadlines, competitive prices and creative problem solving capabilities.

CAPABILITIES

- 9 CNC Lathes to 4.2 metres
- 4 CNC Machining Centres
- 3 CNC Laser Cladding Systems
- 4 Hydraulic Test Benches
- 5 Deep Hole Drilling Systems
- Inhouse Hard Chrome Plating Facilities









HYDRAULICS

Jarvie Engineering has extensive experience and expertise in hydraulic cylinder engineering and precision part manufacturing that provide clients with high quality hydraulic cylinders.

Its priorities are to minimise customer production downtime and facilitate continuous production operations.

The most frequent types of cylinders manufactured or refurbished are:

- Leg Cylinders for Longwall Coal Mining
- Advance Rams
- Shearer Cylinders
- Heavy Earthmoving Cylinders
- Drill Rig Cylinders

Jarvie remanufactures all cylinders according to Original Equipment Manufacturer (OEM) requirements where possible and provides firm quotations after assessing the scope of works.

For customer convenience, Jarvie provides cylinder pick-up and delivery and can service clients from the Hunter and Mackay facilities.

The fully equipped hydraulic workshop is designed for the efficient dismantling, assessment, assembly, and testing of a wide range of hydraulic cylinders, as well as small to medium sized hydraulic pumps and motors.

Jarvie offers a wide range of hydraulic services under one roof and a one stop shop for cylinder manufacture, modification, repair and refurbishment, including hard chrome plating.

Seals can be fitted to customer specification and all machining, chrome plating, assembly and testing is conducted in the Jarvie workshop assuring complete control over the finished product.

For applications where hard chrome is inadequate, or where bronze plating needs to be refurbished, or where the surface has been scoured or otherwise damaged, Jarvie offers a range of surface treatments including polymer impregnation of hard chrome and a variety of materials applied by laser cladding technology.

This laser technology is particularly suited to applications where existing surfaces have been adversely affected by corrosion or wear, and would be scrapped because they are unable to regain integrity through conventional processes.

Densified chrome offers all of the advantages of hard chrome but with an improved corrosion performance, improved lubricity and release properties, and greater overall wear resistance due to reduced friction.

If hydraulic cylinders are damaged beyond repair, Jarvie can manufacture or replace standard parts from stock to ensure a fast turnaround, or provide a replacement assembly from a large range of service exchange cylinders held at Newcastle NSW and Mackay QLD, Australia.

EQUIPMENT & MACHINERY

Ten vertical 'V' block workstations of 4-6 metre deep pits are serviced by five travelling gantry cranes. Hydraulic torque wrenches able to apply up to 65,000 ft/lbs, facilitate rapid disassembly and construction.

TESTING CAPABILITIES

Test bench facilities with capacities up to 1,000 tonne allow for mineral oil, or water emulsion pressure testing of cylinders under restraint up to five metres in length, and 10,000psi.



MECHANICAL OVERHAULS

An experienced team provide quality repairs and modifications to a wide variety of equipment including:

- Continuous Miners
- Auxiliary Fans
- Shuttle Cars
- Drill Rigs
- Roof Supports
- Conveyor Equipment
- Coal Handling Equipment
- Park Braking Systems
- Road Headers

Inhouse welding, fabrication and machining, support a well-equipped fitting shop. These services focus on providing customers with an efficient breakdown service. The Mechanical Overhaul Department offers laser shaft alignment services, auxiliary pump hire, and service exchange wheel units.





TRANSPORT BRAKING SYSTEM FOR EIMCO 913 LHD

Product Profile

The Spring Applied Transmission Park Brake has been developed to remove the need for regular replacement of the actuator shaft. Manufactured by Jarvie Engineering, the brake is available in kit form for in situ fitting.

The Applied Transmission Park Brake is engineered to improve the safety features of the Eimco 913 LHD vehicle braking system. The system is designed to be used on Eimco 913 LHD vehicles only and is not intended for any other use.

This system provides a solution for the need to regularly replace the brake system's splined actuator shaft. Should the hydraulic system lose pressure, the spring mechanism activates the brake, ensuring positive braking.

The assembly is available in kit form ready to be fitted to the vehicle braking system in place of the existing hydraulic brake cover and valve



assembly. Installation instructions are provided with the kit, which includes a preset pressure reducing valve for inclusion into the brake line.

Jarvie Engineering manufactures and tests the Park Brake Assembly in its Newcastle facilities and provides warranty that the product is in accordance with its standard terms and conditions of sale.

Technical Specifications

- Eimco 913 LHD
- Spring Applied Transmission
- Park Brake Modification
- Approval No. MDA DEV 13/1



MACHINE SHOP

Jarvie Engineering was established as a high quality machine shop. For about 60 years, it has expanded the range of technologies, products and services to cater to changing customer needs.

From its origin as a repetition engineering company, Jarvie has progressed to a general engineering and manufacturing facility specialising in hydraulic cylinder manufacture and repair. This guided the development of a unique combination of processes associated with this progression.

These processes include:

- Large Turning (1m swing x 8000mm length bed)
- Deep Hole Drilling (30-150mm diam. depth 7000mm maximum)
- Deep Hole Boring (30-500mm diam. depth 7000mm maximum)
- CNC Gundrilling (5-30mm diam. depth to 100 x hole diam.)
- Cylinder Honing (to 400mm diam. x 8000 mm stroke)
- Cylindrical Grinding to 3000mm
- CNC Milling
- CNC Turning
- CNC CO² & Diode Laser Surfacing (5-Axis)

A skilled team of tradesmen, including many who served their apprenticeship with Jarvie, supports the Machine Shop. Jarvie is Quality Endorsed by SAI Global to the International Standard AS/NZS ISO 9001.

DEEP HOLE DRILLING

For technical reasons, the same type of drilling tool or equipment cannot be used for all drilling operations. Different drilling systems have been introduced to obtain the desired hole dimensions, hole quality, and economics.

Jarvie Engineering utilises gun drills and Single Tube System (STS) drills and Counterboring tooling as the key to producing holes in components that require hole depths or bores from 10x-drill diameter up to 100x-drill diameter.

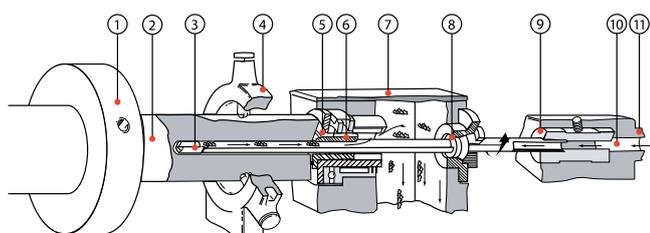
Drilling normally occurs from one end of the work piece, to ensure high quality straight holes to a tolerance IT 10, and a smoothness of 10µm can normally be maintained.

Gun Drilling

The gun drill employs an internal-type cutting fluid supply and external chip exit. The fluid is supplied at very high pressure through the channel to the cutting edge where it lubricates and cools the cutting edge and support pads.

Jarvie uses a CNC system incorporating a stationary work piece and rotating drill for work pieces up to 250kg, hole diameters ranging from 5mm to 30mm.

Gun drills produce holes that conform to high levels of straightness, surface finish, and tolerance.



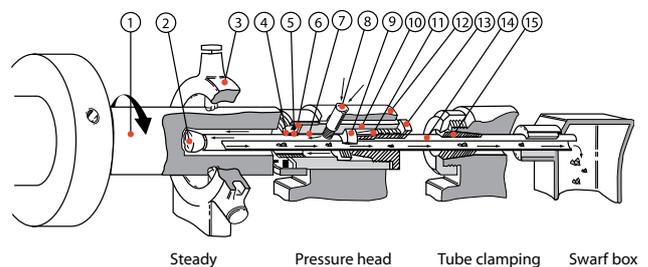
- | | | | |
|---------------|-----------------|-------------|-----------------------------|
| 1. Clamp | 4. Steady | 7. Chip Box | 10. Inlet for cutting fluid |
| 2. Workpiece | 5. Sealing ring | 8. Sealing | 11. Drive Mechanism |
| 3. Drill Head | 6. Drill Brush | 9. Driver | |

STS Drilling

STS drills and Counterboring tools comprise of a drilling head fast threaded to a drill tube. The cutting fluid is pumped under high pressure between the external surface of the drill and the hole being drilled.

The cutting fluid, diverted at the drilling face, transports the chips, through the drill head and out through the tube. The working principle of the Jarvie STS process incorporates a rotating component and a stationary drill.

Hole sizes can vary from 30mm to 150mm drilled from solid to 500mm diameter for counterboring in work pieces up to 6000mm in length and 10 tonne weight. Materials drilled include alloy steels, aluminium, stainless steels, and cast iron.



- | | | | |
|---------------|----------------------------|-----------------------|--------------------------|
| 1. Workpiece | 5. Slip Ring | 9. Drill tube sealing | 13. Guide for drill tube |
| 2. Drill head | 6. Sealing & bearing ring | 10. Sleeve | 14. Drill tube |
| 3. Steady | 7. Drill Brush | 11. Taper | 15. Collet |
| 4. Sealing | 8. Inlet for coolant fluid | 12. Slide | |





LASER METAL CLADDING

A limited number of Australian companies have commercialised laser-applied coatings, as this is a relatively new and expensive technology.

In July 1999, Jarvie commissioned two high-powered CNC industrial laser systems, to complement hydraulic cylinder manufacturing and general maintenance services to the mining industry.

Laser surface engineering can be used to technically advance new designs or recover used components.

Coating or modifying sections of the material surface can tailor component design to cope with a mixture of specific working environments, whilst maintaining the original bulk material properties.

As there is extremely low heat input, the process is suited to the resurfacing of high cost, closely tolerated, alloy steel components, that are prone to distort, have their bulk properties compromised, or crack when welded.

The metallurgical bond contributes to the mechanical strength of the component, and where low or medium hardness materials are selected, the coating can be srewcut, milled, drilled or otherwise machined or formed using conventional tooling.

Laser cladding may be used for large area coverage by overlapping individual tracks, as in conventional welding, or to cover smaller localised areas tailored to individual applications. The maximum thickness of a single pass is 2mm and layers can be built up to any thickness. Dilution is routinely controlled to less than 3%, producing coatings that are metallurgically superior to those produced by arc welding processes.

The larger of the two machines was designed to handle a variety of workpieces up to 1 metre diameter, 6 metres long and 10 tonne weight. Materials available for laser cladding include stainless steels, high nickel alloys, cobalt based alloys, iron chrome alloys, aluminium bronze and tungsten carbide, prepared as atomised powder and deposited through a co-axial laser cladding head.

Advantages of Laser Surface Cladding include:

- Very low weld dilution
- Fusion bond
- Low heat input
- Minimal workpiece distortion
- Dense microstructure
- Chemically clean
- Thin or layered coating
- Minimal after machining
- Fast turnaround
- Wide material selection

LASERWELD® COATINGS

LaserWeld® coatings provides industry with new opportunities for combining the benefits of metallurgically bonded, high integrity alloys on both new and used machine components.

Lasers offer a unique tool for high quality surface modification. The objective of the LaserWeld® process is to fuse onto the substrate, a new material, having tailor designed metallurgical properties, better able to cope with the specific environment.

LaserWeld® coatings are designed to prolong the service life of engineering components exposed to extremely aggressive environments. This is achieved by introducing high power industrial lasers to strategically place a high performance coating in areas most subject to attack by wear and/or corrosion.

Wear

Wear can be defined as the progressive loss of material from the operating surface of a body, occurring as a result of relative motion of the surface with respect to another body. Abrasion, adhesion and contact fatigue are generally regarded as the three basic wear mechanisms that result in material being removed from a material surface.



Corrosion

Corrosion of metals can be divided into two main categories: reactions with gases and reactions with liquids.

Gases that can corrode surfaces include oxygen, carbon dioxide, sulphur dioxide, chlorine and hydrogen sulphide. The underlying mechanism involves the metal forming positive ions, combining with the gas to form compounds.

Corrosion in liquids is electrochemical, and requires an anode, a cathode, and a conducting circuit. A single drop of conducting liquid on a metal surface is sufficient for a corrosive reaction to occur.

LaserWeld® Benefits

LaserWeld® coatings offer significant benefits over competing coatings such as plasma spraying, arc welding, and electroplating. The process is especially suited to highly stressed alloy steel components that may be subject to rolling, bending, or impact stresses. Fully dense light or heavy build-ups can be deposited at temperatures designed to eliminate distortion. Very low dilution and porosity combine to produce a high integrity coating, with established, predictable qualities.

LaserWeld® deposits include austenitic, ferritic and martensitic stainless steels, manganese steel, tool steel, cobalt based alloys, tungsten carbide composites, copper and high nickel alloys.

Deposition is by 5-Axis CNC Laser motion system, suited to shafts up to 1 metre diameter and 6 metres in length, as well as flat surfaces.



FLUID POWER

Jarvie Fluid Power is focused on the requirements of the local hydraulics market and Jarvie has assembled a portfolio of quality products known around the world for performance, consistent quality, and technical excellence.

Jarvie customers receive high quality service from a skilled team of sales engineers, customer visits are often supplemented by manufacturer's representatives to ensure they keep in close touch with customer needs.

Jarvie provides timely after sales service with repairs and maintenance of all fluid power products, and construct special power units and systems to meet customer specific requirements.

Jarvie Engineering is a stocking distributor for:

Stauff Hydraulics

Stauff product include: hydraulic accessories, clamping systems, fittings, tubing, test Couplings, spray nozzles, filters and diagnostic systems.

www.stauff.com.au

Specialised Force

Hydraulic tooling include: crimpers, cable cutters, tree trimming tools, post and ground rod drivers, pole pullers, tampers and tube bending tools, jacking equipment, torque wrenches and lots more including power units and accessories.

www.specialisedforce.com.au

Norgren

A complete range of quality products for use in industrial compressed air systems include:

- Single & double acting cylinders
- Rotary actuators
- Vacuum pumps, cups & switches
- Valves
- Air line equipment
- Fittings, function fittings & tubing
- Regulators & system components

www.norgren.com.au





PORTABLE PRE-CHARGING SAFETY SYSTEMS

Jarvie researches, designs, manufactures and supplies safe and efficient gas charging units for the mining industry. These inert gas charging units are used for hydraulic accumulators, suspension struts, fire fighting systems, brake assemblies and atomizing spray units.

The Jarvie Gas Pre-Charging stations feature safety “pre charging” operations where a pressure relief valve is fitted between the gas source and the unit being charged. This minimises the accidental overcharging of systems that could otherwise result in serious injury to people and extensive damage to equipment.

Custom Manufactured

- Station design blueprints are available upon request
- Units can be portable, mobile or fixed station
- Feature wide pressure ranges
- Include multiple charging facility & many other options





HARD CHROME PLATING

Swanson Jarvie Engineering provides industrial chrome plating for Original Equipment Manufacturers (OEMs) and for the repair of cylinder components.

The hard chrome plating process enhances the mechanical and physical properties of cylinder components including rods, internal tube diameters, rolls and pins.

Swanson Jarvie Engineering has experienced people, equipment and processes to solve the most difficult plating challenges.

When it comes to industrial electroplating and the associated machining, grinding, welding and polishing equipment, Swanson Jarvie Engineering is one of the largest providers in Australasia.

BENEFITS OF CHROME PLATING

- Increases surface hardness
- Provides high quality adhesion properties
- Improves the load capacity
- Increases metal endurance
- Optimises protection
- Applies to wide variety of metal surfaces

CAPABILITIES

Swanson Jarvie Engineering has inhouse capabilities to offer a wide range of products and services.

Hard Chrome Plating

- More than 10m in length
- More than 4m in diameter
- Up to 20 tonnes in weight

Nickel Plating

- More than 6m in length
- More than 3m in diameter

Electroless Nickel

- Up to 2m in length
- Up to 2m in diameter

Lathes

- Turning up to 600mm diameter and 9m in length
- Hi speed bar turning up to 130mm diameter

Straightening

- 1500 tonnes press
- 2 roll, 5 roll & 7 roll reeler straighteners



Precision Grinding

- External grinding up to 15m in length
- External grinding up to 1500mm in diameter
- Internal grinding up to 2800mm in length
- Internal grinding up to 1300mm in diameter
- Also Centreless grinding up to 160mm diameter
- Crankshaft grinding up to 6m long

Onsite Repairs

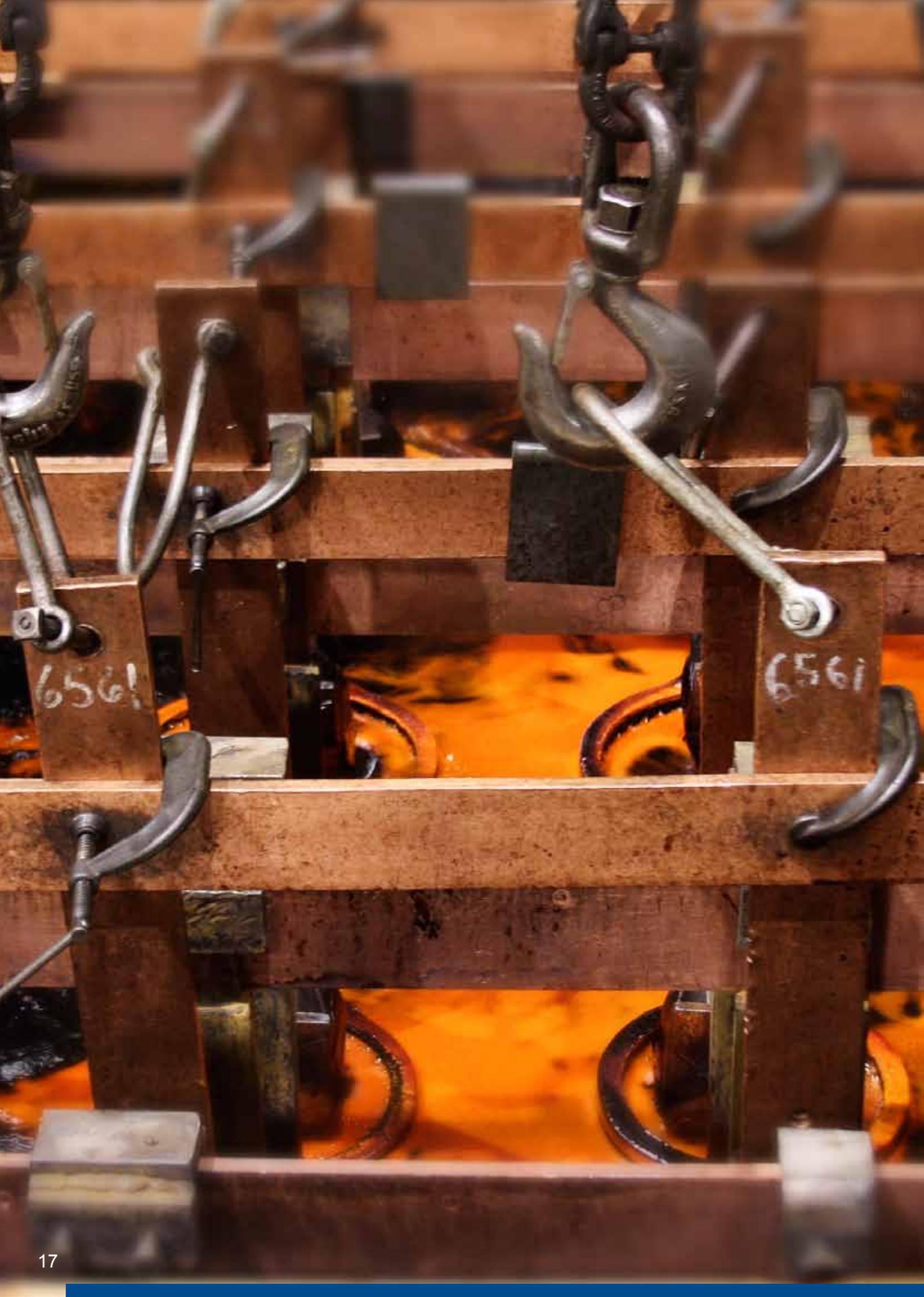
- Specialised selective plating & “cold” dot welding
- Internal Honing
- Up to 450mm diameter
- Up to 6.0m long

Welding

- Submerged arc welding
- General MIG welding

Heat Treatment

- Quench & temper
- Annealing
- Stress relieving
- Up to 6m long
- Up to 2m diameter
- Up to 10 tonnes in weight





Specialised Surface Finishing

- Gloss, matt or mirror finishing for the printing, packaging or food processing industries
- Large engine component repairs
- Large bore cylinder liner
- Complete refurbishing of all main engine piston crowns to Class Certification including Sulzer, MAN, B&W
- Large crankshaft repair facility including straightening, industrial chrome plating, hard chrome plating & grinding

PRODUCTS

Swanson Jarvie Engineering offers an extensive range of hard chrome plating products including:

- Bright steel in carbon & alloy grades 5.0mm - 800mm diameter
- Chrome plated shafting for hydraulic & pneumatic applications 12mm - 200mm diameter in standard lengths of 6.0m, but special extra long shafts are available

SERVICES

Swanson Jarvie Engineering offers a large range of hard chrome plating services including:

- Grinding
- Hard chrome Plating
- Heat treatment
- Nickel Plating
- Straightening
- Turning
- Welding

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Quality
ISO 9001

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