

DARWINS

Corrosion Resistant Castings & Components Since 1774

Get in touch

Contact Darwins to discuss your requirements with one of our experienced technical sales engineers.

Darwins Holdings Ltd.
Sheffield Road, Tinsley
Sheffield S9 1RL
United Kingdom

Telephone: +44 (0)114 244 8421
Facsimile: +44 (0)114 256 1775
E-mail: info@darwinsholdings.co.uk

For more information please visit our website:

darwinscastings.com

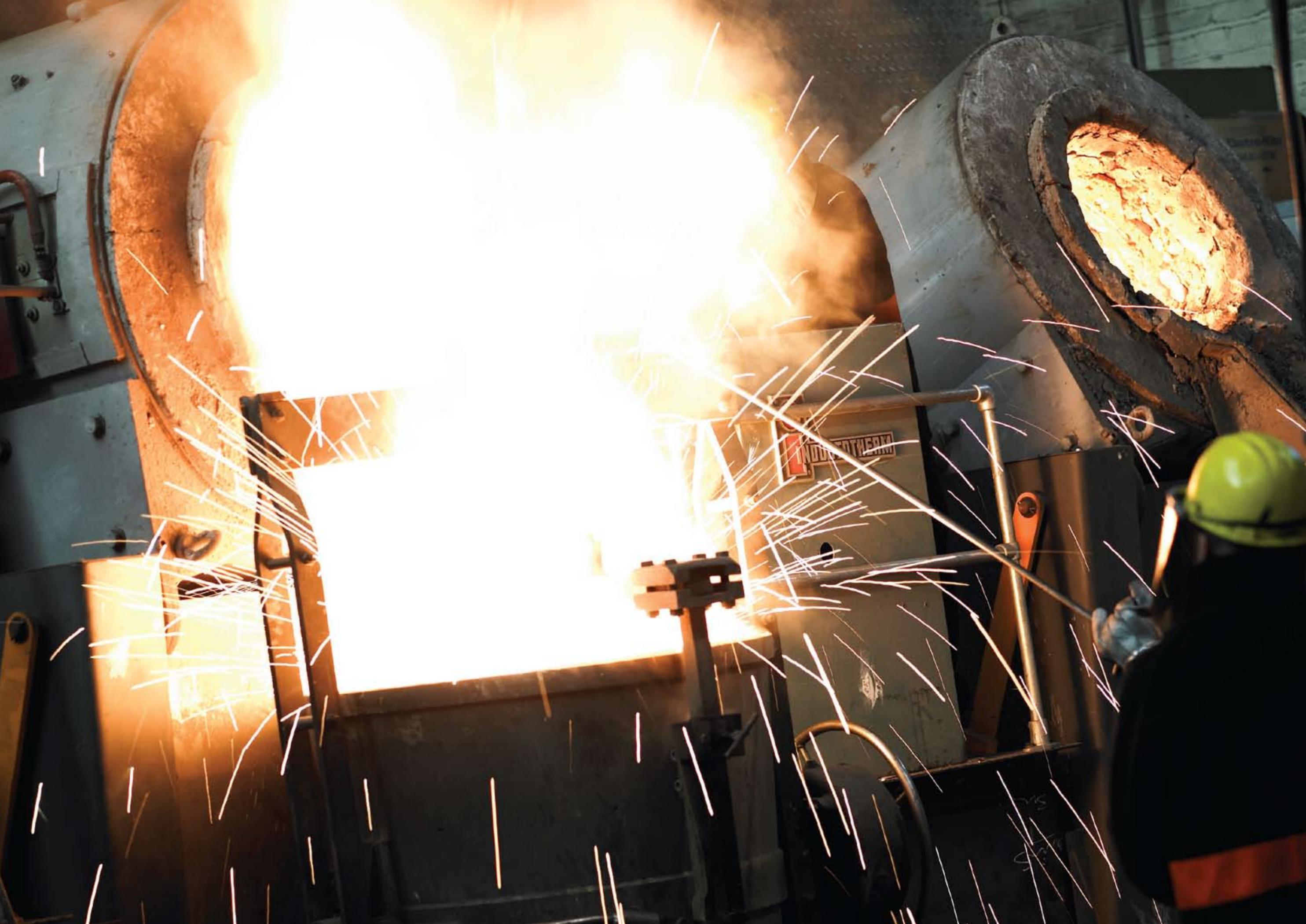
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Welcome

Darwins is one of the UK's leading manufacturers of castings in stainless, high alloy steels and nickel-based alloys from 1kg to 3000kg.

Our high-performance products are designed to withstand even the most demanding applications and offer high levels of durability in contact with corrosive fluids.





INDUSTRIAL

The Company

Since the company was founded in 1774 Darwins has manufactured high integrity castings of exceptional quality at our foundry in Sheffield, the heart of the British steel industry. Darwins has been located at its current site since 1924.

Our expertise in foundry practice has established the company as a leading specialist in pump, valve and process equipment components for the oil and gas, power generation, water, petrochemical and chemical markets. Our experience and adaptability make Darwins well placed to take on the rapid changes occurring in these markets and to help our customers meet the challenges of the future.

Over the years Darwins has grown and developed in line with advances in technology and the demands of our customers. We offer a complete 'one-stop' service, from consultation and design through to manufacturing, testing and certification, making Darwins the ideal partner for both end-users and original equipment manufacturers (OEM).



A long and proud history at the heart of the British steel industry

Project Management

Darwins manages every aspect of each project from initial enquiry through to delivery. Our engineers work closely with customers to design and develop products to the most stringent specifications for both application and budget, using the latest 3D modelling and simulation technologies. We manufacture patterns and castings, carry out rigorous testing and deliver components in either cast or finished machined condition to the customer within the agreed timeframe. Because we believe in being flexible and adaptable Darwins is highly responsive to the demands of new and existing customers. We are able to react rapidly to change and provide long-term solutions to engineering challenges.

We believe in building strong and enduring partnerships with our customers, which is why we are trusted to meet and even exceed requirements time after time.



Expertly managing each project from initial enquiry through to design, manufacture, testing and delivery

Products Manufactured

Pumps and Compressors

Darwins specialises in the manufacture of the following castings:

- Impellers:
Single entry and double entry shrouded – Open – Vane wheel
- Casings and Covers:
Vacuum pump – Centrifugal – Multistage – Chemical
- Pump bowls
- Diffusers

Valves

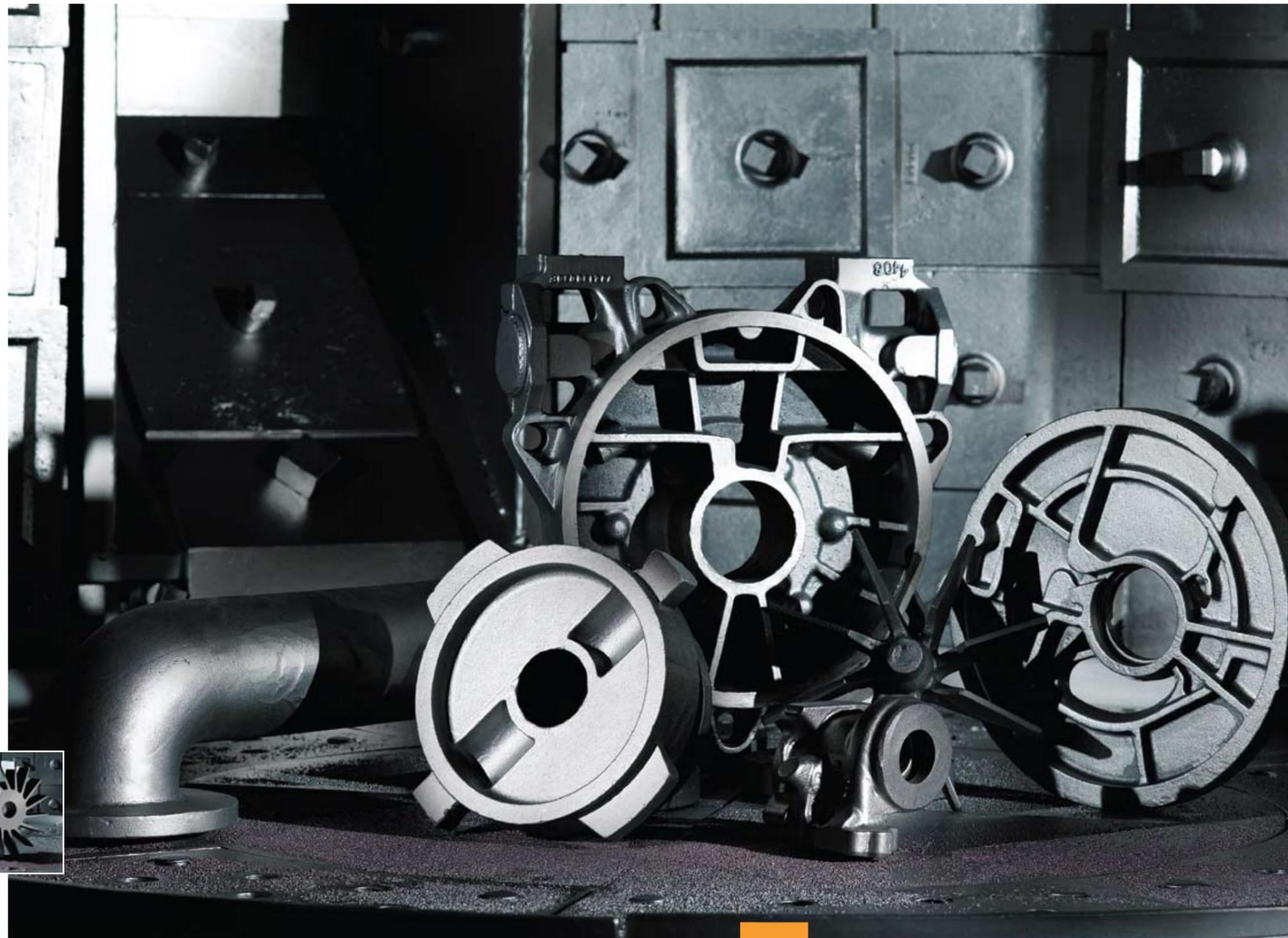
Our expertise in casting difficult alloys to high integrity specifications is vital for safety-critical applications. We provide components for all types of valves – including gate, globe, check, ball and butterfly valves – ranging in size from 15mm to 1 metre, covering most pressure ratings.

General Engineering

Darwins manufactures a large range of parts for general engineering, including:

- Turbo housings
- Die parts
- Gear parts
- Wear rings
- Bearing housings

Our products are supplied to precise specifications in a cast, proof machined, or finished machined state.



High performance products to withstand even the most demanding applications

Patterns and Castings

In our fully equipped pattern shop we produce patterns to customer drawings or electronic data files, and provide expert advice on casting design through Solidworks 3D modelling. Our highly skilled and experienced pattern makers have all undergone careful training as part of the Darwins apprenticeship scheme, and are specialists in making complex patterns for casting purposes.

From these wood or resin patterns we make high integrity, chemically bonded sand castings, ranging in size from 1kg to 3000kg, for a variety of industries.



Experts in making complex patterns for high performance casting solutions

Markets

Darwins works closely with a large range of industries, which rely on the quality and durability of our products and the flexibility of our service.

We produce sand castings for all kinds of pumps, valves and process equipment. Our highly skilled workforce provides solutions to complex engineering challenges, from initial design through to pattern making, manufacturing and testing.

For our full client list please go to the Darwins website:

darwincastings.com/client_list



Oil and Gas

We produce all kinds of components for use at high pressure with natural gas, oil, seawater and other corrosive substances. Applications, both onshore and offshore, include:

- Flare gas recovery
- Separation plant
- Loading/unloading
- Drilling
- Fire protection
- Water injection
- Well heads

Power Generation and Nuclear

Darwins components are widely used for power generators and ancillary equipment in nuclear, gas, hydro-electric and coal fired plants.

Process

Darwins is a regular supplier to a range of process industries:

- Chemical
- Pharmaceutical
- Food and sugar
- Industrial cleaning
- Iron and steel
- Paint, pigments and coatings

We can advise on the correct materials and manufacturing technology for the required components, and have an appreciation of the ongoing need to minimise the cost of capital equipment.

Marine and Desalination

Darwins has a longstanding relationship with the marine and water industries. We offer the right materials and designs for safe, reliable, corrosion resistant components for use at sea. Our short lead times and highly responsive service help customers to minimise down-time and maximise productivity.

Pulp and Paper

Darwins manufactures components in martensitic, austenitic and duplex stainless steels to hundreds of specifications for the pulp and paper industry. We can advise customers on the most suitable materials to ensure wear and corrosion are kept to an absolute minimum.

High alloy steels and nickel-based alloys provide solutions to the most complex engineering challenges

Materials Technology

Darwins can meet even the most exacting material requirements. We provide alloy steel and nickel-based components to industries with the most rigorous demands for reliability and durability.

The materials we work with include:

- Carbon and low alloy steels
- Martensitic stainless steel
- Austenitic stainless steels in stabilised, unstabilised and low carbon forms
- Duplex and super-duplex steels
- High-alloy austenitic steels
- Super austenitic steels
- Heat-resisting steels
- Wear resistant steels
- Monel, Hastelloy®, Inconel and other nickel-based alloys

Darwins supplies a large range of components to most national and international specifications, including British Standard, ASTM, JIS and DIN.

Detailed information about the materials we use can be found overleaf.



A complete range of non-destructive testing and certifications ensures the highest levels of quality

Materials Technology continued

Carbon and Low Alloy Steels

These materials are used for a wide range of applications from general engineering applications to creep resistant steels in power stations. Carbon steels can fulfill a wide range of roles where corrosion resistance is not a particular requirement. The addition of small quantities of manganese results in acceptable low temperature properties down to -46°C.

Additions of small amounts of chromium, nickel and molybdenum result in alloy steels with increased strengths to 1000 MPa and good toughness following a water quench heat treatment. Air cooled steels with chromium and molybdenum (typically 2.25% chromium, 1.0% molybdenum) are used extensively in the power generation industry for their creep properties.

Nickel Based Alloys

Nickel based alloys are necessary for a range of arduous environments which would attack the stainless, iron-based materials. With 40% nickel and 20% chrome, Alloy 825 offers very high resistance to both oxidizing and non-oxidizing hot acid conditions and outstanding resistance to stress-corrosion cracking. It is resistant to pitting corrosion by all except strongly oxidizing chloride solutions. With approximately 40% iron content, its material cost lies between that of duplex and the other main nickel based alloys. Hastelloy® C type alloys (15% chrome, 15% molybdenum, nickel based) gives outstanding corrosion resistance in both reducing and oxidizing media. It is widely used in the severest environments encountered in chemical processing, pollution control, pulp and paper production and other fields.

Hastelloy® B type alloys (30% molybdenum, nickel based) were developed particularly for resistance to hot concentrated hydrochloric acid solutions and hydrogen chloride, particularly reducing conditions.

Alloy 625 (20% chrome, 9% molybdenum, nickel) has high fatigue and creep strength and excellent corrosion resistance. It is highly resistant to chloride ion stress corrosion cracking. It finds use in pumps and valves for handling acids at elevated temperatures in the food, chemical, mining and petrochemical industries.

Monel alloys (70% nickel, 30% copper) show good resistance to attack in reducing environments. It is widely used in handling sulphuric, hydrochloric and organic acids in the marine, plastics, steel and food processing industries.

Heat Resistant Alloys

A range of alloys for applications requiring strength and stability at high temperatures up to 1200°C. Common alloys in this range include 25% chrome / 12% nickel for use up to 1050°C in non-carburising conditions, through to 50% chrome / 50% nickel alloys used to withstand corrosion

caused by fuel-ash deposits at high temperature. Typical applications include the cement industry (burner nozzles grids), heat treatment (hearth supports, radiant tube, tube supports), petrochemical (tube sheets, cast bends).

Stainless Steels

The standard 304 and 316 type stainless steels offer similar strengths to those of the low carbon steels but with much improved corrosion resistance. The molybdenum containing 316 type has become the standard stainless for constructional applications and sea water environments.

Significantly higher strengths and wear resistance, with lower corrosion resistance, are provided by

the 13% chromium and 13/4 (13% chrome with 4% nickel addition) types of stainless steel. The 13/4 type is more commonly employed as a casting over the straight 13% chrome because of its higher ductility and lower propensity to cracking. The 13/4 steel is ideal for many pump parts, particularly impellers where its combination of corrosion and wear resistance, and strength are recognised.

Duplex Steels

Where increased strength and corrosion resistance are sought, the duplex stainless steel range of materials may be considered. Their duplex austenite – ferrite structure provides approximately twice the proof strength of 316 stainless and far superior resistance to stress corrosion cracking.

The type of duplex employed generally depends

upon the corrosive environment. The 22% chrome duplex offers an improvement over 316 stainless in general pitting corrosion, whilst the 25% chrome super duplex offer significantly higher pitting and crevice corrosion resistance in warmer, chloride (sea water) environments. Duplex stainless steels are therefore found in many pump parts and valves involved in handling such media.

Special Alloys

Darwins has literally hundreds of internal alloy grades and we are well known for offering a vast range of materials. Customers' specific requirements are being continually fulfilled. We offer the full range of LaBour corrosion resistant

alloys, including K26 and R55 alloys. K26 is used in handling hydrofluoric acid, sulphurous and phosphoric acid solutions whilst R55 is noted for its resistance to a wide variety of acids and salts such as alkaline solutions.

Meeting even the most exacting material requirements

Quality and Testing

Darwins has earned an exceptional reputation for quality. The latest technology and the application of stringent testing procedures ensure our components always meet the highest national and international standards. We have held accreditation for the quality management system used to control our processes since 1993, and currently hold ISO 9001 certification.

Darwins has a longstanding relationship with the marine industries, and we have held accreditation with the Lloyds Register of Shipping for the supply of castings for marine applications also since 1993.

Our quality systems are regularly reviewed and updated, and we are happy to discuss any additional approvals or requirements that may be necessary to meet individual customer specifications.

Darwins offers a complete range of non-destructive testing services and certifications, including:

- Melt analysis prior to pouring via on-site spectrometer
- Chemical analysis
- Mechanical testing - at high, low and ambient temperatures
- Corrosion testing
- Liquid penetrant inspection
- Ultrasonic inspection
- Radiographic examination
- MPI (Magnetic Particle Inspection)
- PMI (Positive Material Identification)

Certificates can be downloaded from the Darwins website.



Supplying components to industries with the most rigorous demands for reliability and durability

The Future

Ongoing investment in technology and in our workforce ensures Darwins is poised to take on the challenges of the future.

Rapid changes taking place within so many of the industries we serve – notably power generation, and the increasing shift towards nuclear and renewable energy sources – offer exciting opportunities for expanding the capacity of the company. Our customers and potential customers can rely on our expertise to help them also to adapt to these new challenges.

The Darwins apprenticeship scheme will continue to nurture and develop the skills, motivation and commitment of our workforce now and in the future, safeguarding the exceptional quality of our products and service.

Generations of experience: moulding chargehand Darren Bedford and his apprentice patternmaker son Ryan.



Investing now to meet the challenges of the future

