DONCASTERS
PARALLOY

The formula for success
in heat resistant alloy
tube technology

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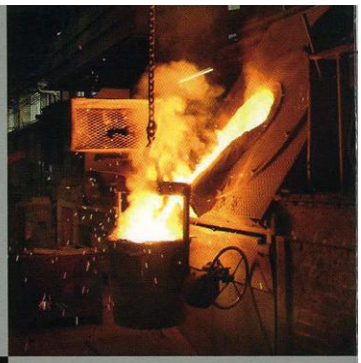
- Fabricated coils and tube assemblies for petrochemical furnaces
- A tradition of excellence
- Heat resistant alloy technology



Introduction

Experience and expertise

Doncasters Paralloy has been manufacturing specialist high quality cast tubes and fittings for use in high temperature and corrosive environments for more than 40 years. During this time we have perfected centrifugal casting, sand casting techniques and welding processes that allow new options for plant design in the refining and petrochemical industries worldwide.

Paralloy's experience is rooted in its origins as APV Paramount, a company that spearheaded the development of heat resistant cast alloys, centri-spinning, tube machining and fabrication processes. We now continue that tradition of innovation and excellence.

We are based at Billingham in the north east of England where high alloy tube production began in 1967 with a centrifugal casting foundry and machine shop. Subsequent additions of purpose built static casting, fabrication and electro-chemical machining facilities together with up to date computer aided design have produced a world class single site operation having optimum control of production and quality.

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The Process

At the heart of our operations is the centrifugal casting foundry where liquid metal is cast into tubes by pouring into a refractory lined cylindrical metal mould rotating horizontally at high speed. Centrifugal forces in excess of 100 G distribute the liquid evenly onto the mould surface and drive undesirable lighter material to the bore which is subsequently machined out. The selection and application of the refractory together with control of the liquid alloy feed, temperature and speed of rotation allows tubes of various length, diameter and wall thickness to be produced with equally high integrity.

In addition to tube, many applications also require cast fittings. Doncasters Paralloy has established a first class high alloy static castings foundry. Computer aided design and solidification modelling ensure optimum methods to produce high integrity castings. The use of refractory paints and ceramic filters in the moulds produces extremely clean castings with exceptional surface finish.

Fabrication is also carried out on site. Initially tube to tube welds are produced by an automatic tig (GTAW) process. Flanges and fittings are added using manual GTAW processes. Wherever possible matching consumable is used to achieve maximum weld strength. All welding procedures and qualifications are produced to the relevant international standards and endorsed by Lloyds Register.

1 Casting

2 Machining

3 Fabrication

Selection Guide - High Temperature Applications

PARALLOY GRADE		H20	H21	H39W	H39WM	H46M	H48T	CR32W	CR39W	PARAGON C
COMMON REFERENCE		HK40	HK40 high Si	HP Nb Mod	HP Microalloy	35/45 Microalloy	22H	800H	HP Nb Low C	PARAGON C
TYPICAL UPPER	°F	1180	1180	2010	2060	2060	2910	1830	2010	2060
TEMPERATURE LIMIT	°C	1025	1025	1100	1125	1125	1200	1000	1100	1125
STEAM REFORMING (Catalyst Tubes)	Ammonia	●		●	●	●				
	Methanol			●	●	●				
	Hydrogen	●		●	●	●				
	Direct Reduction			●	●	●	●			
	Outlet Manifolds (Headers)							●		
PYROLYSIS CRACKING (Radiant Coils)	Ethylene		●	●	●	●	●	●	●	●
Transfer Lines								●	●	
Tube Hangers, Supports, Guides		●		●	●	●	●			

The Product

Doncasters Paralloy produce centrifugally cast tubes and fittings for high temperature service. This can be in the form of individual replacement parts and operating spares, complete tubes for steam reforming furnaces, manifolds, transfer lines and fully fabricated reformer harps and pyrolysis coils.

Advanced centrifugal casting techniques, materials and processes have made Doncasters Paralloy a leader in the manufacture of radiant coils for ethylene production. Small diameter and thin wall tubes meet the needs of current furnace design development. Product advances such as internally profiled PEP tube and Paragon alloys give benefits in increased production throughput or longer run time between de-cokes.

Working in conjunction with local induction bending companies, Doncasters Paralloy has developed procedures for bending cast tube in all of our alloys and also for internally profiled tube.

With a flexible and multi-skilled workforce and integrated single site operation, Doncasters Paralloy is able to offer the fastest response to priority or breakdown situations.

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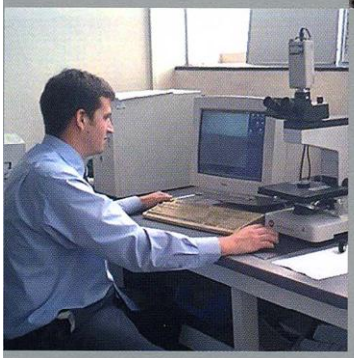
Assured Quality



Paralloy tubes and castings are designed to operate at the extremes of metallurgical performance and therefore the quality of our materials must be of the highest standard.

A quality assurance system based on highly disciplined procedures is approved to BS EN ISO 9001:2000 and relevant national quality standards. Continuous improvement is driven by management through the extensive use of Kaizen and Lean Sigma events. There has also been considerable investment in training for the entire workforce.

Quality control at all stages of manufacture ensures that product not only conforms to the customer's specification and requirements but also the high standards on which Doncasters Paralloy's reputation is built.

A high degree of customer satisfaction is essential and Doncasters Paralloy take great care to ensure that technical support is available when necessary. Advice is available on alloy selection, effects of operational variations and remaining life. Our laboratory services are also available to customers for material examinations.

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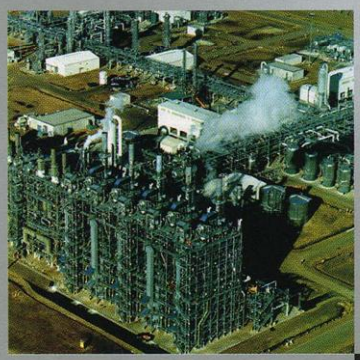
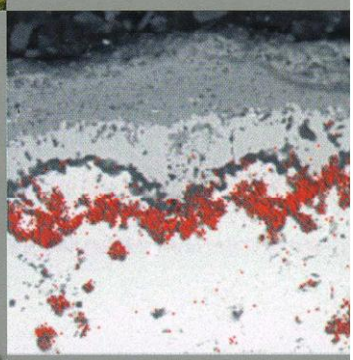
Research and Development

Listening to our customers



At Doncasters Paralloy we believe in providing products to match the needs of our clients. We are not simply alloy producers but also alloy and process developers. Our knowledge and experience of service conditions have been developed through close liaison with key customers and furnace designers. This brings benefits to the industry through the development of new materials and products.

After specifically identifying the needs of ethylene producers and pyrolysis furnace designers we have developed the centrifugal casting process, extending the limits of the process and increasing the options available to designers.



Paragon C has been developed as the next generation alloy for pyrolysis furnace radiant coils. The introduction of aluminium produces a stable internal oxide beneath the chromium and silicon oxides. This layer is resistant to spalling and forms a self healing barrier which reduces catalytic coking and carburisation rate.

PEP (Paralloy Ethylene Profiled) tubes with extended internal surface for better heat transfer, can be designed into a furnace re-vamp to give significant increase in throughput. All of our current alloys can be profiled allowing the optimum in carburisation resistance with improved productivity.

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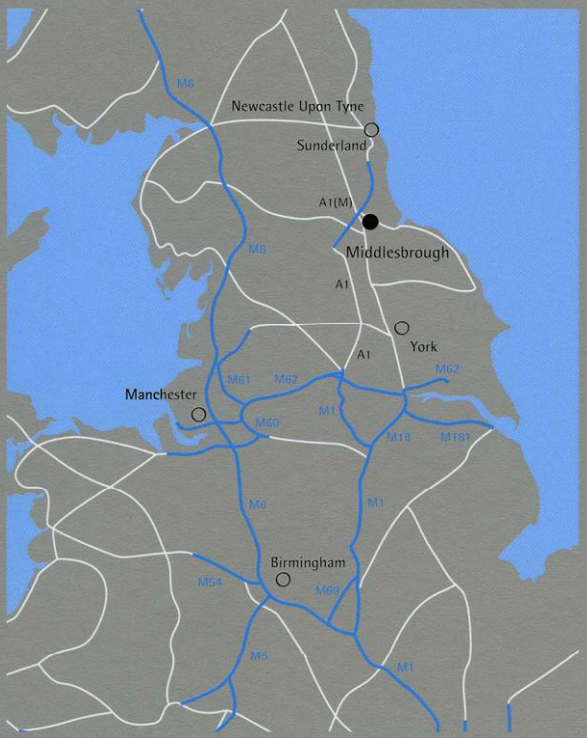

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