

VACUUM MELTED SUPERALLOYS

TURNING **METALS** INTO **MOTION**



ROSS & CATHERALL

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Part of the Doncasters Group



ROSS & CATHERALL

A GLOBAL LEADER IN SUPERALLOYS
“OUR EXPERTISE ADDS VALUE TO CHEMICAL
ELEMENTS TO MEET CUSTOMERS’
EXACTING CHEMISTRIES”.

A GLOBAL LEADER

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Ross & Catherall →

Ross & Catherall have been producing nickel, cobalt and iron-based vacuum induction melted superalloy master melt cast bar stick from 1968 and has maintained its position as one of the world’s leading superalloy manufacturers through market growth and continuous investment, with an enviable international reputation for high quality and dependability.

Our alloys can be found across a wide range of performance critical applications as diverse as turbine blades, nozzle guide vanes, structural parts and other components for aero engines, large land-based gas turbines, space exploration, orthopaedic medical implants, hot-end turbocharger wheels, and other special components requiring high temperature metallurgical integrity.

Ross & Catherall hold approvals from most of the world’s leading OEMs in these fields. The Company provides a wide range of in-house value-added services and supports its customers with advanced supply chain services and logistics.

ABOUT US

For 50 years, Ross & Catherall, located near Sheffield, UK has earned an acclaimed worldwide reputation for quality and technical excellence in its production of nickel and cobalt-based superalloys for critical-use applications within the global investment casting industry.

This reputation has continued to grow in all the sectors it serves, including Aerospace, Industrial Gas Turbine (IGT), Additive Manufacturing (AM) Space Exploration, Medical and other applications, and it is synonymous within these sectors for its research and development capabilities,

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Markets Served →

world class production methodologies, with emphasis on product quality and innovation, combined with continual investment in technology, facilities and people.

We ensure that the highest quality raw materials are used and guarantee the highest level of technical control, ensuring consistent production with repeatable, tightly controlled chemistries and metallurgical integrity.

We are entrusted with a wide range of industry accreditations and certifications with a proven reputation for supporting leading manufacturers with superalloys that meet the most stringent requirements.

SUPERALLOY MANUFACTURING EXCELLENCE

- Alloys for Directional Solidified (DS), Equiax (EQ), Single Crystal (SX) and powder atomisation applications
- Leading OEM alloy approvals
- Flexible production capabilities
- Dedicated in-house Nadcap and ISO 17025:2017 accredited testing approved analytical laboratories
- In-house revert processing and storage

MARKETS SERVED

As a fully-integrated facility, Ross & Catherall ensures that extensive production, R&D, and supply chain support capabilities are at your disposal.

Ross & Catherall co-ordinate with customers to provide long term, cost effective solutions for both today's product requirements and tomorrow's technical road maps. We continuously support customer requirements with both process and production technology employing current best practices.

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Production Facilities →

Typical Alloy Composition:

- Vacuum Melted Nickel-based Superalloys
- Vacuum Melted Cobalt-based Superalloys
- Vacuum Melted Iron-based Superalloys
- Air Melting of Iron Alloys, Steels, Stainless Steels, Nickel and Cobalt-based Alloys



AEROSPACE



INDUSTRIAL GAS TURBINE



ADDITIVE MANUFACTURING



MEDICAL



COMMITTED TO PRODUCING THE
HIGHEST QUALITY PRODUCT
WITH UNEQUALLED SERVICE AND
ON-TIME IN-FULL DELIVERY



PRODUCTION FACILITIES

Many of our products are used in some of the most challenging environments with critical requirements from aerospace and industrial gas turbine engines, requiring high temperature capabilities, as well as parts used in orthopaedic medical implant prostheses and alloys for the manufacture of automotive turbochargers.

In order that we meet the highest quality customer requirements and ensure that we manufacture our extensive range of alloys to meet our customers stringent requirements we have a comprehensive, OEM approved, range of the latest technology manufacturing furnaces, laboratory testing capabilities and processing facilities.

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Process Route →

Our melting department provides customers with the flexibility to choose from a range of 8 Vacuum Induction Melting (VIM) production furnaces ranging in capacities of 500kg, 2800kg, 4000kg, 6000kg and 7200kg.

Cast bar diameters range from 75mm (3") to 175mm (7") supplied in full random lengths or with the option of cut to specific weight. Surface finish can be spot ground, fully ground and/or spot ground and shot blasted.

To complement the VIM foundry there is a dedicated air melting foundry on site with 2 induction melting furnaces, 1 x 1000kg and 1 x 2200kg melting a wide range of air melted alloys.

Furnace Capacities kgs (lbs)	Bar Diameter mm (inches) "as cast"
500 (1,100)	75 (3"), 88 (3 ½), 100 (4"), 125 (5"), 150 (6"), 175 (7")
2 x 2800 (6,200)	
4000* (8,800)	
7200 (15,800) *	

* 4 x furnace bodies

PROCESS ROUTE

Our manufacturing processes ensure that the final alloy manufactured is made to the exacting standards required for all our customers and sectors supplied, with repeatable and consistent quality delivered in each and every melt.

- Raw Materials & Revert
- Mould Assembly
- Melting
- Mould Stripping
- Surface Preparation and Cutting
- Inspection

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In-House Revert Processing →

WORLD CLASS SUPERALLOYS FOR THE MOST DEMANDING APPLICATIONS, DELIVERING QUALITY AND INNOVATION THROUGH INVESTMENT IN PEOPLE AND TECHNOLOGY



RAW MATERIALS AND REVERT



MOULD ASSEMBLY



MELTING



MOULD STRIPPING



SURFACE PREP AND CUTTING



INSPECTION

DELIVERING A **CIRCULAR ECONOMY**
FROM YOUR **CLOSED-LOOP** REVERT
GENERATION THROUGH SUSTAINABLE
MELTING PRACTICES.

IN-HOUSE REVERT PROCESSING

Our in-house revert processing and preparation facility utilises the revert from customers, creating a “closed-loop” network ensuring the final composition and specifications are met, delivering a truly “circular economy” of production and consumption within our melting and processing functions.

Recycling of revert helps to reduce mining and refining of elements globally, as such reduces the environmental

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Mould Assembly →

impact of the final components made by our customers, ultimately enhancing the sustainability of the whole manufacturing process.

Revert is valuable, it contains elements such as Ni, Co, Ta, Re, Hf, W etc. It has the exact composition of the finished cast component it was derived from, as such it can be “recycled” back into sustainable superalloy bar stick - reducing the need for additional “mined” raw materials.



XRF INSPECTION



PREPARATION



CUTTING



SHOT CLEANING



FURNACE READY



CHARGE READY

MOULD ASSEMBLY

To optimise the casting quality of the alloys, the mould preparation and assembly process is critical in meeting the customers final surface dimensions, yield, and surface quality.

From tube selection - cleaning and preparation, mould frame assembly, location and correct fitment of the technical ceramic refractory distribution and runner systems are all critical in mould assembly to ensure that

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Melting Furnaces →

the moulds fill accurately and efficiently, to produce a superior surface finish and quality with optimised cast yields.

Once built, the mould frames are loaded onto transfer “bogies” into the pre-heat ovens at a set temperature and a pre-determined cycle time, or “soak” time - this is to ensure that the tubes, refractories and frames are free from any moisture that may be present from the atmosphere prior to loading into the vacuum pouring chamber, ready for alloy pouring.



TUBE CLEANING



TUBE BUILD



HEADBOX ASSEMBLY



ASSEMBLED FRAME

MULTIPLE VACUUM INDUCTION MELTING FURNACES

Whether it's small or large production volumes, all nickel, cobalt, and iron-based alloys are produced by Vacuum Induction Melting (VIM) utilising the largest selection of furnace capacities available in the northern hemisphere, capable of manufacturing alloys to the industry's most stringent specifications.

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Alloy Processing and Finishes →

Ross & Catherall has proven itself to be one of the most capable superalloy cast bar stick producers in the world. By employing best practices, R&D, production capabilities and innovations, we provide customers with a single source for the widest range of advanced alloy products.

Ross & Catherall are entrusted with a wide range of OEM accreditations and certifications and has earned a reputation for supporting leading manufacturers with superalloy cast bar stick utilising the latest technological melting systems that meet the industry's most stringent operational requirements.



500kg



3 TONNE



4 TONNE



7 TONNE



CONTROL PULPIT



MELT CHAMBER

ALLOY PROCESSING FINISHING AND INSPECTION

Alloy processing and finishing encompass a broad range of techniques designed to enhance the physical and aesthetic properties of metal alloys, making them suitable for specific applications.

Through these sophisticated processing and finishing techniques, alloys are tailored to meet the rigorous demands of industries, showcasing the critical role of material science in technological advancement.

9 Laboratory Testing and Analytical Services →

Processing and Finishes:

- Cut to weight
- Shot blasting and grinding
- Notch fractured
- Welded lifting hooks
- Air melted ingots
- All Billets / Ingots 100% portable XRF tested and identified
- Bespoke, individual bar marking available
- Shipped in reusable, ecofriendly Heat-Treated wooden boxes



GRINDING



CUT TO WEIGHT



FINISHING



INSPECTION

LABORATORY TESTING AND ANALYTICAL SERVICES

Ross & Catherall's alloys can be found across a wide range of performance critical applications as diverse as turbine blades, nozzle guide vanes and other components for aero engines, large land-based gas turbines, hot-end turbocharger wheels, medical implants, and other special components requiring high metallurgical integrity.

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Serving the Global Community →

Ross & Catherall hold approvals from the world's leading OEMs in these fields. We provide a wide range of value-added services and support its customers with advanced supply chain services and logistics.



**GAS FUSION OXYGEN
& NITROGEN**



**X-RAY
SPECTROSCOPY**



**GLOW DISCHARGE MASS
SPECTROMETER (GDMS)**



SERVING THE GLOBAL COMMUNITY



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SUPERALLOY MANUFACTURING EXCELLENCE

Vacuum melting since 1968

Aerospace, IGT, Additive Manufacturing, Space Exploration and biomedical sectors

Supplying to the Investment casting and Metal Powder Manufacturing industries

Over 50-year history of product and process development