



a World Leader in the
development and production
of high-performance alloys

Special Metals Corporation



Future thinking...time tested 100 years of alloy technology



The Special Metals Corporation group of companies was created in the latter part of 1998 when Special Metals Corporation of New Hartford, New York, acquired Inco Alloys International, including its Huntington Alloys and Wiggin Alloys divisions. With a history of alloy technology now going back some 100 years, our new company continues to provide solutions to your difficult materials problems through such time-tested products as our world-recognized INCONEL®, INCOLOY®, NIMONIC®, UDIMET®, MONEL® and NILO® alloys.

Today's Special Metals is a world leader in the invention, production and supply of the high-nickel, high-performance alloys used for "the difficult jobs in engineering." These alloys are highly engineered to offer a superior combination of heat resistance, high temperature corrosion resistance, toughness and strength and are used in the world's most technically demanding industries and applications. Special Metals offers the largest range of nickel-based alloys and product forms, as well as cobalt-based alloys, to more than 10 worldwide markets. We produce nickel alloys in all standard mill forms, from large ingots and billets to plate, sheet, strip, tubing, bar and wire, the latter of which includes core and filler wires for welding products. The company has manufacturing and research facilities in the USA and Europe, sales offices in North America, Europe and Asia, and a distribution network including most of the industrialized countries of the world.

With more than 100 years of leadership in our history, we won't rest on our laurels now. We will keep striving to achieve higher levels of service and product performance. Today's Special Metals also looks to the future with aggressive research and development programs at our facilities in the U.S.A. and Great Britain. Approximately 85% of all alloys currently manufactured by Special Metals were invented in our laboratories and the work continues. With combined corporate facilities bringing together the best technical support, production capabilities and experience in alloy technology, our professional scientists, engineers and technologists are better equipped than ever to develop new materials and processes to meet the needs of customers worldwide.

*Top left:
Special Metals
Corporation,
Huntington,
West Virginia,
U.S.A.*

*Center:
Special Metals
Wiggin Ltd.,
Hereford,
England.*

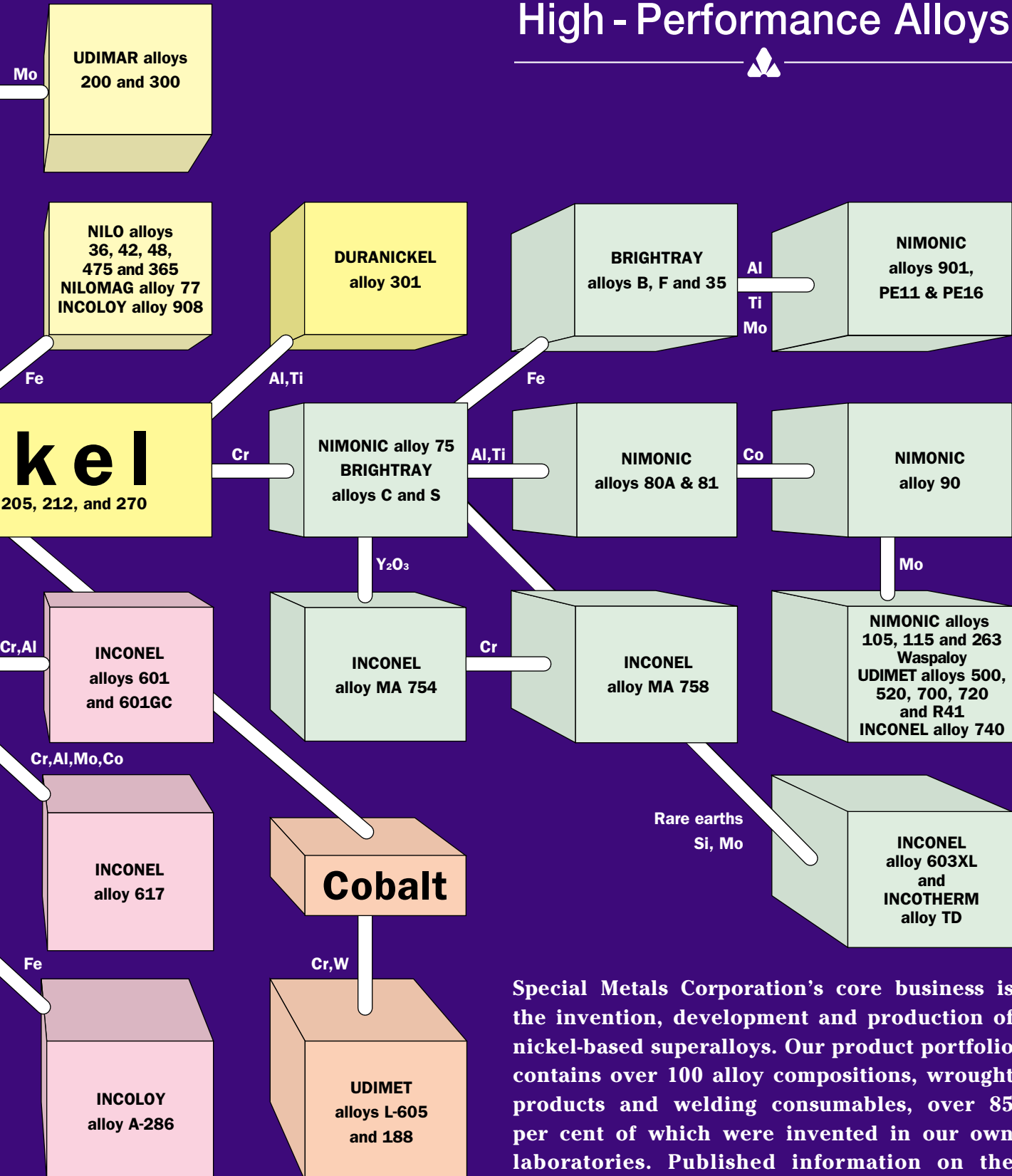
*Bottom left:
Special Metals
Corporation,
New Hartford,
New York,
U.S.A.*



- You know our products... time-tested alloys recognized worldwide.
- You know our company... we're Special Metals, Huntington Alloys, Wiggin Alloys, and the former Inco Alloys International Inc., now all part of the new Special Metals Corporation group of companies.
- You know our vision... customer respect, product quality, innovative technology... for now and for the future.



High - Performance Alloys



Special Metals Corporation's core business is the invention, development and production of nickel-based superalloys. Our product portfolio contains over 100 alloy compositions, wrought products and welding consumables, over 85 per cent of which were invented in our own laboratories. Published information on the physical and mechanical properties of these products, the most comprehensive range of alloy compositions and product forms available from a single manufacturer, is available on request, or on our website, www.specialmetals.com

Quality Assurance



'Quality Assurance' at Special Metals Corporation is a process developed as a means of ensuring our customers that all their requirements and needs are met. It includes a detailed system of operating process procedures, published in Quality Manuals and audited regularly. These operating procedures are applied to every manufacturing operation, from the control of raw materials to the dispatch of the product. It is also an attitude of mind, a philosophy of customer service that permeates the entire organization, and is a frequent focus of training and re-training programs.

It begins with the receipt of an inquiry and the submission of a quotation. Order requirements are confirmed and matched to a manufacturing plan that includes detailed instructions for alloying, hot- and cold-working, testing to required standards, heat treatment, alloy form and condition, product marking, packaging and dispatch. Computer-based customer service information systems track the orders through the production cycles.

All products are fully traceable to the alloying operations. Information is retained in accordance with customer and regulatory agency requirements for as many as 40 years. Retention of such information may be either in hard copy or electronic format. Special Metals Corporation meets the critical product needs of our customers through its commitment to Quality Assurance, capital investment, and the skills and experience of its people.

Below:

Mechanical test specimens



Right:
Creep-rupture testing



Right:
Corrosion testing

Quality system and laboratory accreditations and approvals granted to the production facilities of Special Metals include the following:

Lloyd's Register Quality Assurance	ISO 9002, AS 9000
ABS Quality Evaluations Inc.	ISO 9002, AS 9000
Performance Review Institute	NADCAP, Ultrasonic (AS7003, AS 7114), ISO Guide 25, Material testing
ASME Boiler & Pressure Vessel Code	NCA 3800
AFAQ	BS EN ISO 9002, ISO/TS 16949
CAA	B2, Material manufacturer B4, Test House
UKAS	ISO/IEC 17025 Testing ISO/IEC 17025 Calibration
RW TÜV	AD-Merkblatt WO, Material manufacturer Merkblatt 1153, Welding consumables



*Left:
Ultrasonic testing
of tubular products.*

*Below:
Laser measurement
of cold-drawn bar.*



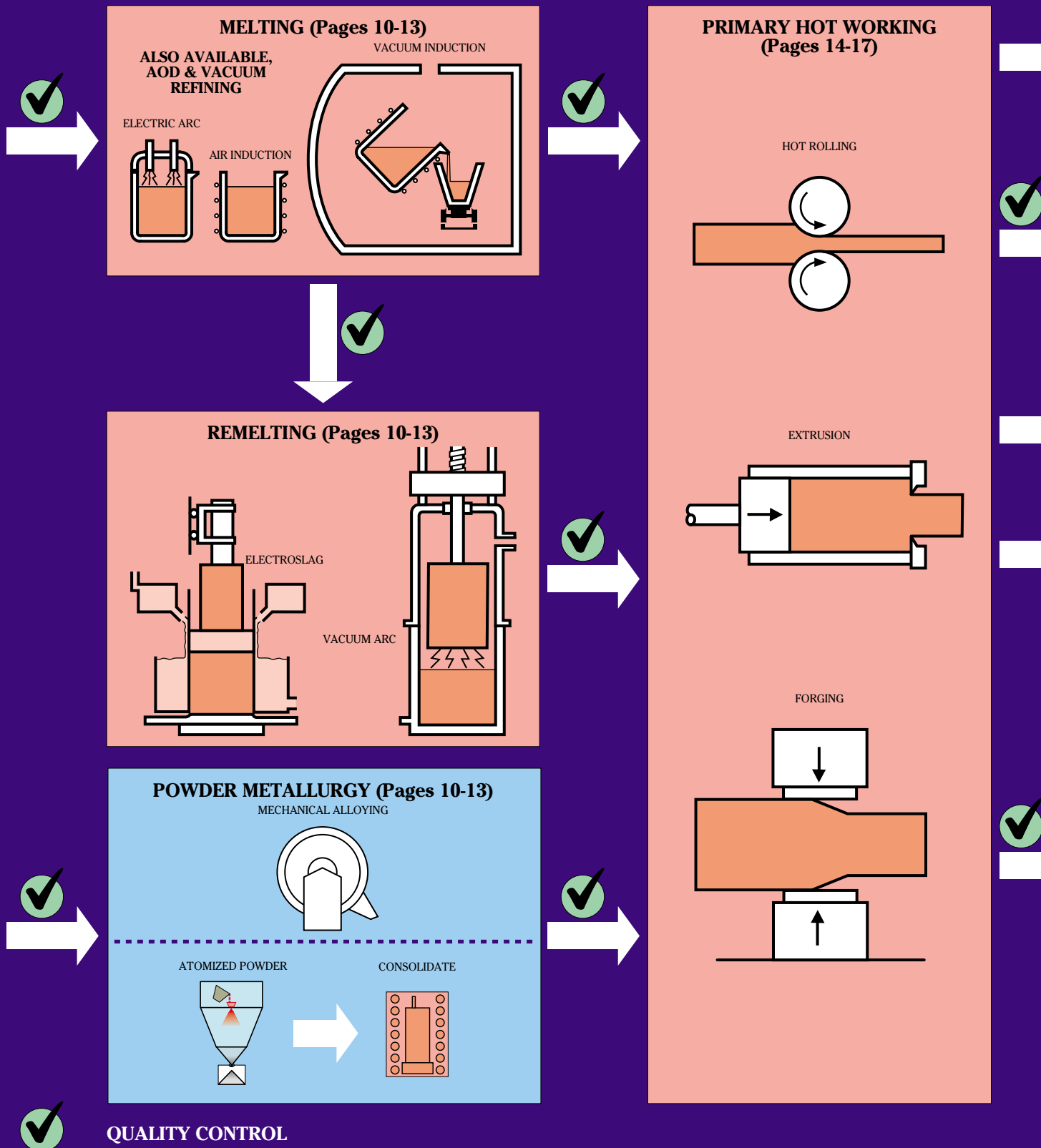
*Bottom:
Tensile testing at up
to 1200°C (2190°F).*



Other institution and customer company approvals include:

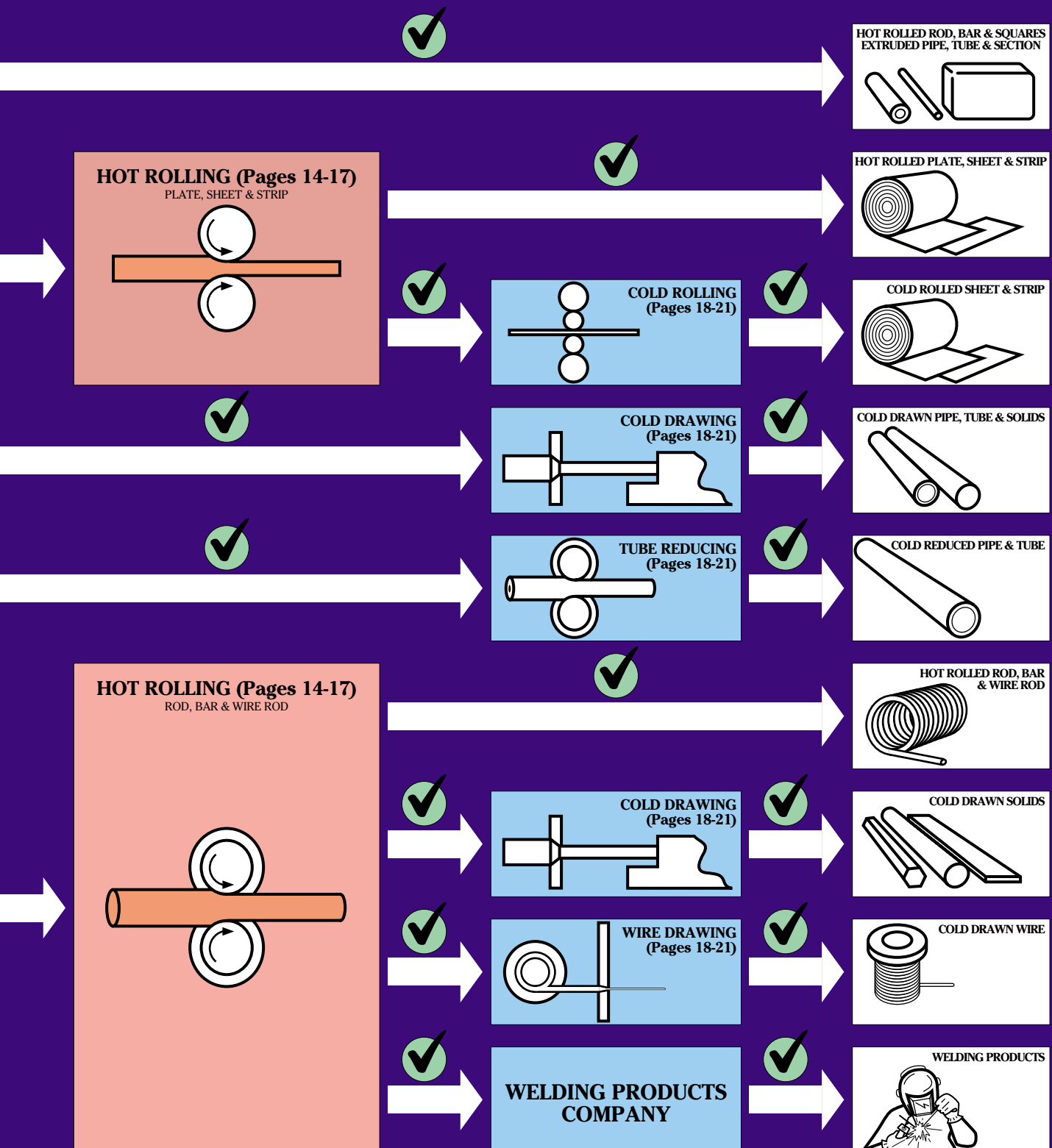
- | | | | |
|-----------------------------|------------------------------------|--------------------------|---------------------------|
| ■ Accudyne Corporation | ■ Coulter Steel | ■ McDonnell Douglas | ■ SNECMA |
| ■ Airbus France | ■ Dep't of the U.S. Navy | ■ McInnes Steel Company | ■ Textron |
| ■ Al Tech | ■ ESAB Group | ■ Mecair Inc. | ■ Tube Turns Div. |
| ■ Allegheny Ludlum | ■ FiatAvio | ■ MTU | ■ United Technologies |
| ■ Allied Signal | ■ Fortech | ■ Nuclear Alloys | ■ Utica Corporation |
| ■ Allison | ■ Fry Steel | ■ Pratt & Whitney | ■ Volvo Flymotor AB |
| ■ Aramco | ■ G.S. Precision | ■ Pratt & Whitney Canada | ■ Westinghouse |
| ■ Baker Oil Tools | ■ General Electric Aircraft Engine | ■ QUALIFAS | ■ Wyman Gordon Grafton |
| ■ Berkshire Ind. | ■ General Electric Gas Turbines | ■ RHP Bearings | ■ Wyman Gordon Houston |
| ■ Boeing Company | ■ Honeywell | ■ Rockwell International | ■ Wyman Gordon Livingston |
| ■ Bohler | ■ Ladish | ■ Rollmet | |
| ■ BWX Technologies | ■ Lenape Forge, Inc. | ■ Rolls Royce plc | |
| ■ Consolidated Power Supply | ■ Maillefer Instit. | ■ RWTüV | |

Special Metals Production Routes



QUALITY CONTROL

Quality controls are applied throughout production, from receipt of orders and selection of raw materials, to deliveries and finished stocks. Manufacturing routes are selected to meet specifications and other requirements such as form, temper and finish.





The Alloying Processes



ELECTRIC ARC & AIR INDUCTION MELTING
ARGON-OXYGEN-DECARBURIZATION (AOD)
REFINING

VACUUM REFINING

VACUUM INDUCTION MELTING (VIM)

VACUUM ARC REMELTING (VAR)

ELECTROSLAG REMELTING (ESR)

MECHANICAL ALLOYING

POWDER ATOMIZATION



Above left:
The 22 tonne
(48,000 lb) vacuum
induction melting (VIM)
furnace at Special Metals
Corporation, Huntington.

Above right:
A vacuum arc remelting
(VAR) furnace, one of nine at
Special Metals Corporation,
New Hartford. This unit can
produce remelted ingots up to
1016 mm (40 in)
diameter, weighing up to
18 tonnes (40,000 lbs).

Left:
A vacuum arc remelting
(VAR) furnace, one of two at
Special Metals Wiggin Ltd.,
Hereford. This unit can
produce remelted ingots up
to 760 mm (30 in) diameter,
weighing up to 9 tonnes
(20,000 lb).

Right:
A vacuum arc remelting
(VAR) furnace, one of six at
Special Metals Corporation,
Huntington. This unit can
produce remelted ingots up
to 915 mm (36 in) diameter,
weighing up to 23 tonnes
(50,000 lb).





Left:

Electroslag remelting is one of the company's major international investment programs of recent years.

Currently there are two such multi-furnace facilities in the U.S.A., and one in Europe dedicated to meeting the purity requirements of the aerospace and other high-technology industries. The facility in this picture is at Special Metals Wiggin Ltd., Hereford.

Far Left:

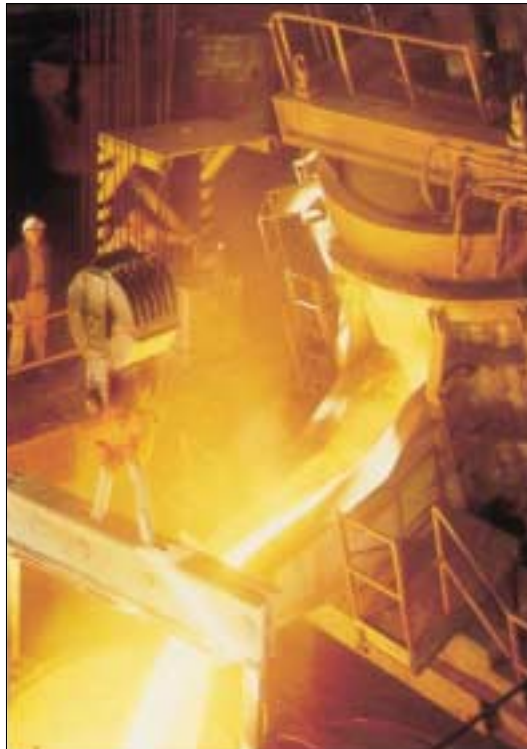
Electroslag remelting at Special Metals Corporation, Burnaugh, Kentucky, producing ingots up to 1115 mm (44 in) diameter, weighing up to 22.5 tonnes (50,000 lb).

Below:

The 18 tonne (40,000 lb) vacuum induction melting (VIM) furnace at Special Metals Corporation, New Hartford.



Above:
Mechanical alloying, to produce oxide dispersion strengthened nickel- and iron-based alloys, is carried out at Special Metals facilities in the U.S.A. and England.

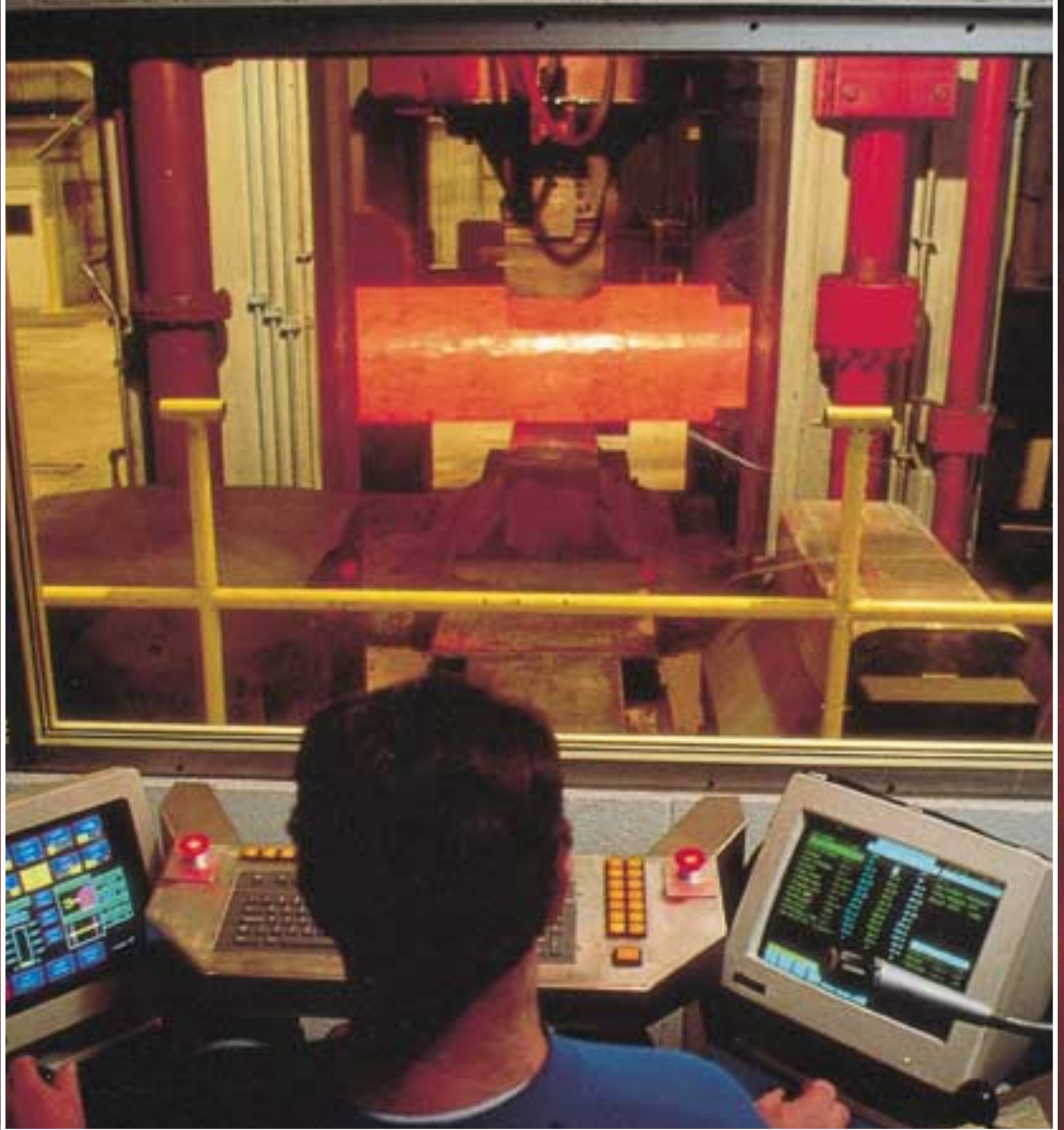


Above:
Pouring one of the 32 tonne (70,000 lb) electric arc furnaces at Special Metals Corporation, Huntington. The AOD refining facility at Huntington matches the capacity of the electric arc furnaces.

Below:

High-purity nickel superalloy powders are produced by vacuum induction melting and gas atomization at Special Metals Corporation, Princeton, Kentucky.





Hot Working Processes



HOT ROLLING OF BILLET, BAR & PLATE

HOT ROLLING OF SHEET & STRIP

EXTRUSION OF BAR, TUBULARS
& SHAPED SECTIONS

HOT ROLLING OF ROD, BAR & WIRE ROD

FORGING OF BILLET & BAR

Below:

The hot sheet/strip reversing mill at Special Metals Corporation, Huntington, is equipped with automatic gauge and crown control to roll coils of hot band up to 1575 mm (62 in) wide, weighing up to 11.25 tonnes (25,000 lb). Material is held at the optimum rolling temperature by furnaces located at either side of the rolling stand.



Top Left:

The 4000-ton computer-controlled die forging press at Special Metals Corporation, Huntington.



Bottom Left:

The 4000 tonne hydraulic ingot conversion press utilizing dual manipulators and full computer integration, at Special Metals Corporation, Dunkirk, New York.

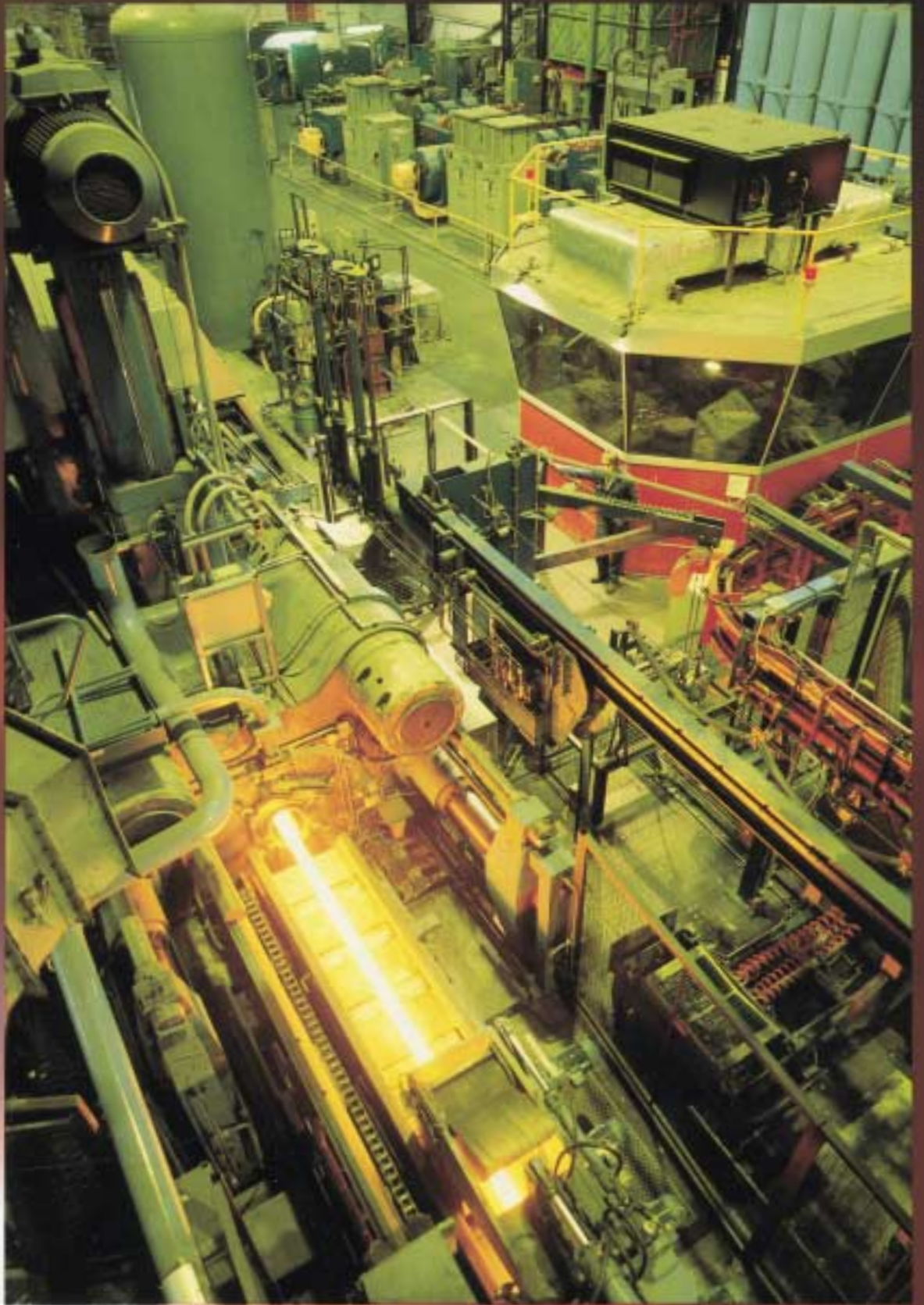
Above:

The 1750 tonne computer-controlled forge press at Special Metals Wiggin Ltd. Hereford.



Above:

The primary hot-rolling mill at Special Metals Corporation, Huntington, produces billets and slabs for further processing to a range of product forms.





*Left:
Hot rolling at Special Metals Corporation, Huntington, to produce plate products 4.7 to 150 mm (0.2 to 5.9 in) thick, up to 2591 mm (102 in) wide.*

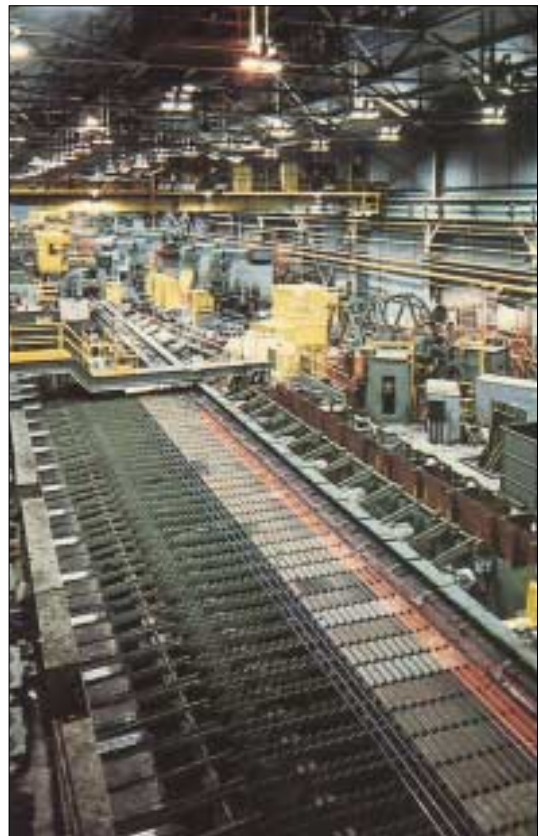
*Below:
Trepanned billets ready for extrusion at Special Metals Corporation, Burnaugh, Kentucky.*



*Left:
The computer-controlled 5650 tonne extrusion press at Special Metals Wiggin Ltd., Hereford. Extrusion facilities, in England and the U.S.A., are used to produce bar, tubular products, and shaped sections.*

*Above:
Computer aided design (CAD) is used to develop profiles for extrusion, and to assist in die design, particularly for the near-net profile superalloy sections made for aircraft gas turbine engine casings. (Special Metals Wiggin Ltd., Hereford).*

*Right:
The bar and wire mill at Special Metals Corporation, Huntington, takes billets up to 2020 kg (4500 lb) and hot rolls, via one of three routes, to rod, bar, wire rod and flats.*





Cold Working Processes



COLD ROLLING OF SHEET & STRIP

COLD DRAWING OF SOLID SECTIONS

COLD DRAWING OF PIPE & TUBE

TUBE REDUCING (PILGERING) & U-BENDING

COLD DRAWING OF WIRE

FOIL PRODUCTION BY ELECTRODEPOSITION

MACHINING, SHEARING & PLASMA CUTTING

Above left:
The wide sheet/strip
Sendzimir (Z-mill) at
Special Metals Corporation,
Elkhart, Indiana, can roll
down to 0.200 mm
(0.008 in) thick, and up
to 1220 mm (48 in) wide.
The multiple slitler is at
the same location.

Below:
The 11 m (36 ft),
long-cut, plate shear
at Special Metals
Corporation, Huntington.



Left:
High-purity nickel
foil, produced by a
continuous
electrodeposition
process.
(Special Metals
Wiggin Ltd., Hereford.)



Left:
Plastic film wrapping
to protect the surface
of high-quality
cold-rolled sheet.
(Special Metals
Wiggin Ltd., Hereford.)

Below:
In-line decoiling,
leveling and cutting
of sheet/strip.
(Special Metals
Wiggin Ltd., Hereford.)



Left:
Plasma cutting of plate
and sheet, including
circles and shapes.
(Special Metals
Services SA, Lyon,
France)



Left:
The tube reducer at Special Metals Wiggin Ltd., Hereford, produces high-quality tubing in diameters up to 115 mm (4.5 in) and lengths up to 20 m (66ft).



Below:
High-speed, multi-strand wire drawing, down to 0.1 mm (0.004 in) diameter, at Special Metals Wiggin Ltd., Hereford.

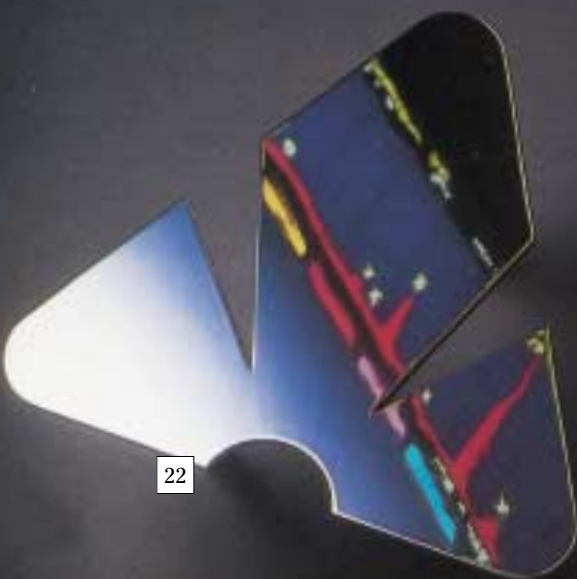


Above:
The 4-high, 2000-tonne separating force reversing mill at Special Metals Corporation, Huntington, has fully automated entrance and exit facilities, including a separate recoiler. It is capable of producing weld-free coils to 54 inches wide and weighing up to 13.5 tonnes (30,000 lb).

Right:
The computer-controlled, dual-head, abrasive saw at Special Metals Corporation, Huntington, cuts plate up to 150 mm (6 in) thick, to tolerances of plus or minus 4.76 mm (0.1875 in) on width and length.

Below Right:
Special Metals Welding Products Company produces a wide range of premium-quality nickel alloy welding products including electrodes, mig and tig wires, flux cored wires and flux.





Research & Development



The Special Metals Corporation Group of Companies is an acknowledged world leader in the invention and production of high-performance alloys. Of the more than 100 alloy compositions produced in the Special Metals product portfolio, over 85 per cent were invented in our own laboratories.

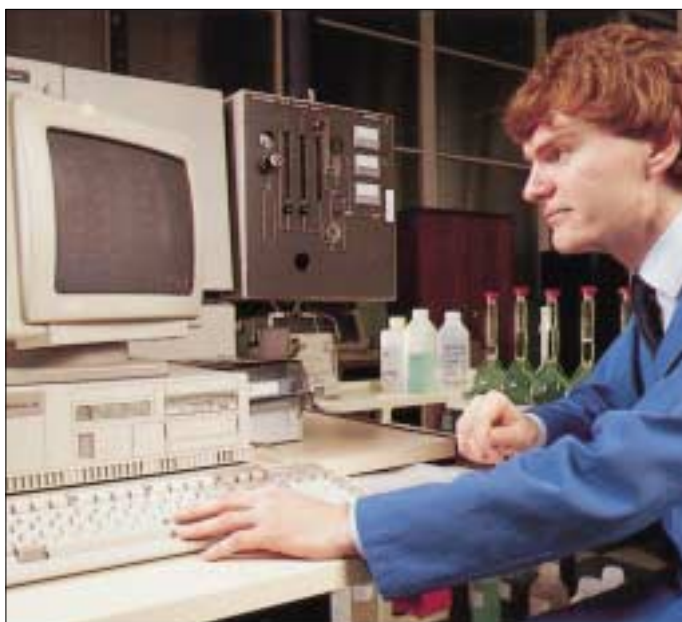
Research programs are undertaken in the laboratories, in the U.S.A. and Europe, to develop new materials, to evaluate alloy performance in simulated process environments, to improve the technology of our own manufacturing facilities, and to support the day-to-day quality assurance procedures that are an integral part of all the production activities.

Below:

Huntington's Technology Processing Center supports process research and alloy development programs, as well as the manufacture of small quantities of material for evaluation.

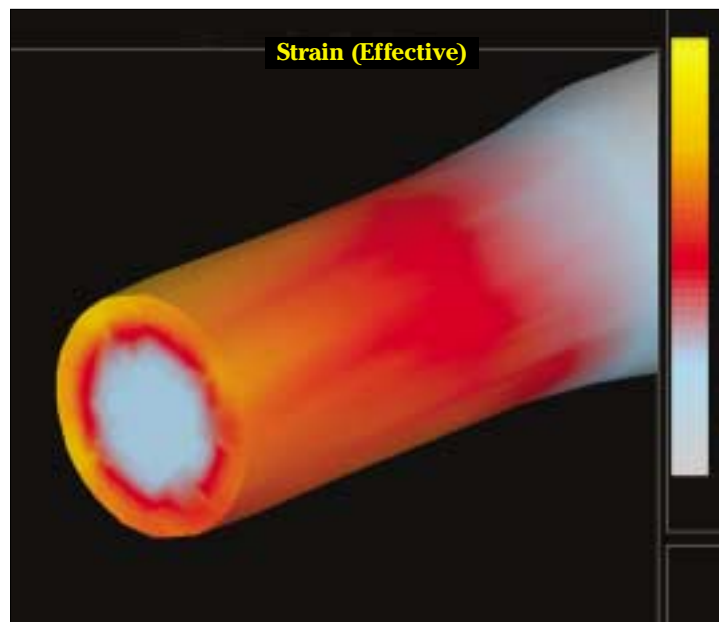
Below center:

Finite element analysis, conducted by the Numeric Process Modeling Group at New Hartford, is used to improve product quality and yield.



Above Left:

The 400 test station creep laboratory at Special Metals Wiggin Ltd., Hereford, operates around the clock, under computer control of testing and data management systems, on short- and long-term test programs.



Above:

Analytical capabilities include simultaneous and sequential analysis by inductively-coupled plasma spectroscopy.



Below Left:

Pilot-scale vacuum induction melting in New Hartford's Process Lab, one of several melting and refining technologies in regular use for superalloy development.

Right:

A scanning electron microscope is used to analyze phases at very high magnifications.



www.specialmetals.com



U.S.A.

Special Metals Corporation

Billet, rod & bar, flat & tubular products

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Fax +1 (304) 526-5643

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+1 (800) 334-8351
Fax +1 (315) 798-2016

Atomized powder products

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Princeton, KY 42445
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Fax +1 (270) 365-5910

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