



Leadership in Specialty Alloys



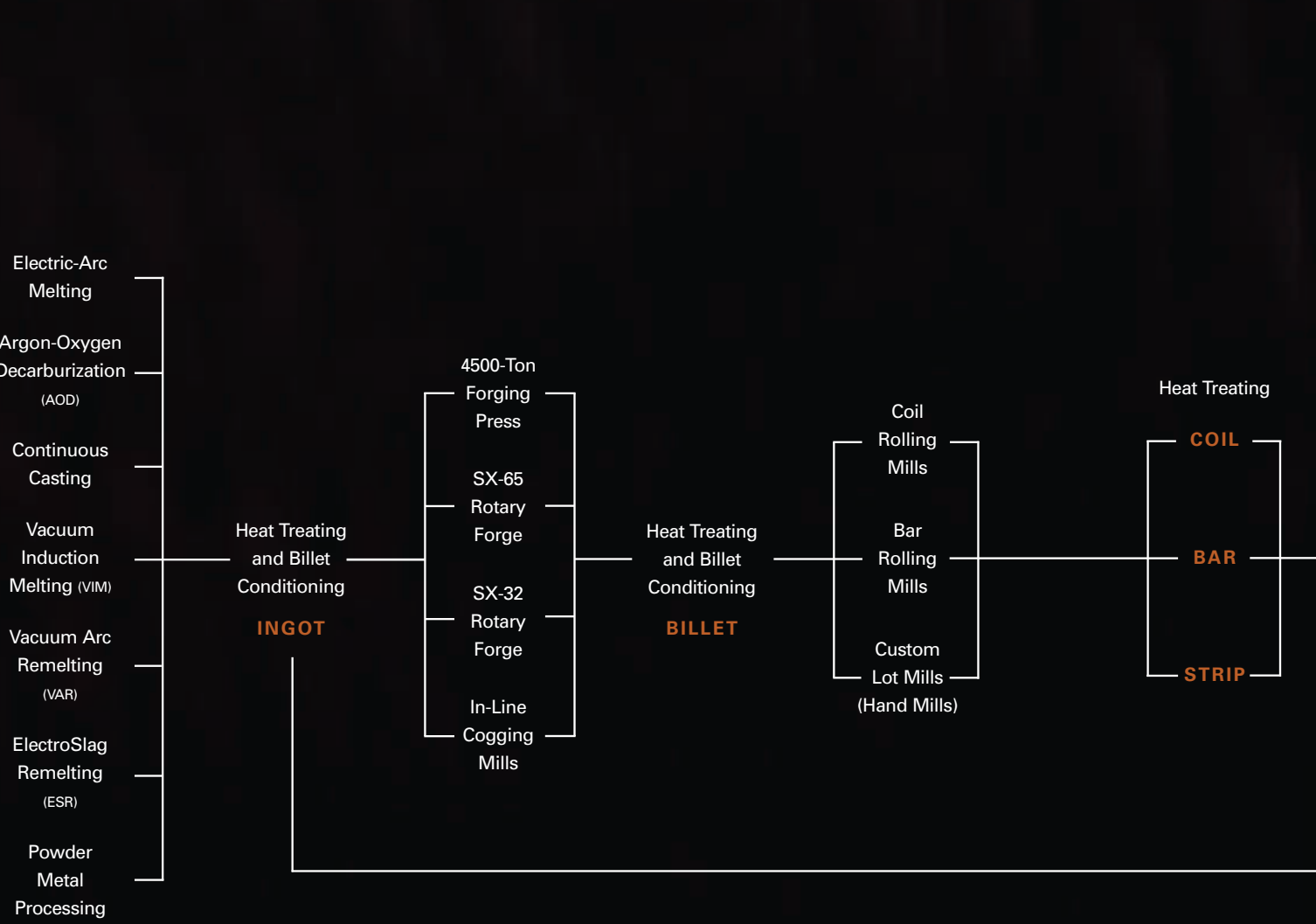
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THE CARPENTER MILL AT A GLANCE

Carpenter Technology Corporation (NYSE: CRS) employs state-of-the-art manufacturing processes, hot working and finishing facilities. Our primary goal is to help our customers innovate to meet the world.



MELTING

Melting produces specialty alloys in ingot form and may include a combination of processes.

REMELTING

Remelted product exhibits improved cleanliness and other desirable properties, necessary for making alloys for critical applications.

HOT WORKING

Here, large ingots are rolled, pressed or forged into intermediate sized billets for further processing. Some billet product may be shipped directly to customers.

HOT ROLLING

During hot rolling, billets are progressively rolled to smaller cross sections and emerge as hot rolled bars or coils of rod, wire, flat strip or special shapes in long product form.

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Carpenter's specialty alloys have been used in aircraft, automobiles, electronic devices, consumer goods, medical implants and instruments, and power generation, petro-chemical processing and industrial equipment—wherever critical material challenges exist.

Carpenter's strategically located distribution facilities on four continents provide specialized alloys in loose powder or cast-wrought long products to customers throughout the world. Its main manufacturing facility and headquarters is located in Reading, Pennsylvania.

Visit us at www.carttech.com for a location near you or call our headquarters at 610-208-2000.



COLD FINISHING

Cold finishing produces finished forms of bar, wire, fine wire, strip and special shapes.





A WORLDWIDE LEADER IN SPECIALTY ALLOY PRODUCTION



MORE THAN A CENTURY OF SPECIALTY ALLOYS PRODUCTION

Today's global marketplace demands the right specialty alloys coupled with on-time delivery and knowledgeable technical support. And at Carpenter, that's precisely the service offering our customers can expect.

For more than a century, Carpenter has been a world leader in the production of hundreds of types of stainless steels, high temperature (iron-nickel-cobalt-base) alloys, high-strength steels, controlled expansion alloys, superior corrosion-resistant alloys, tool and die steels, and other special purpose alloys. Product forms

include bar, rod, wire, fine wire and ribbon, special shapes, hollows, strip, billet and plate.

With our highly specified product- and customer-focused service approach, Carpenter has provided the specialty alloys that helped to advance the automotive, aerospace, defense, energy, industrial, sporting goods, medical and consumer product industries.

What's more, Carpenter metallurgists, research scientists and engineers work closely with the industry's best to continually define and redefine the leading-edge of materials technology and find the best solutions to your design and production challenges.

❶ The Carpenter Steel Company, as it was known when founded in 1889, quickly gained prominence in the fledgling "special" steel industry. Pioneering developments include an air-hardenable steel in 1896 and engine parts that helped the Wright brothers grow their upstart "aeroplane" business. ❷ The 20-metric-ton vacuum induction degassing pouring furnace gives Carpenter one of the most advanced VIM facilities in the world. ❸ Ensuring quality, Carpenter metallurgists use light optical microscopes to examine the microstructure in a high temperature alloy.



AND MATERIALS INNOVATION

ADVANCED MANUFACTURING AND QUALITY SYSTEMS

Anticipating a growing, global demand for increased product quality, available forms, alloy selection and reduced lead times, Carpenter has implemented strategic system and process upgrades.

Carpenter is dedicated to integrating today's most sophisticated, leading-edge manufacturing equipment to melt, press, anneal, roll, draw, mold, shave, cut, grind, coat, clean and trepan specialty materials – as evident with a capital expansion project that included a \$200 million investment to increase premium melting capacity by 40 percent.

Carpenter's quality systems are approved to ISO 9001:2000 and AS9100 standards. The synergies of our quality systems, variation reduction to Six Sigma programs and state-of-the-art manufacturing facilities leverage our ability to meet industry specifications as well as exacting customer requirements.

A WORLDWIDE NETWORK OF SALES AND SERVICE CENTERS

All the technology and capability in the world is meaningless if our customers can't get the materials they need, when and where they need them.

Skilled sales and service professionals guide customers in grade selection, offer various types of technical assistance, arrange field consultations with expert metallurgists, obtain availability, pricing and delivery information, and offer many other types of helpful support. And an integrated communications system links all Carpenter sales offices to each other and to our mills, keeping

real-time track of order status, inventory and other essential delivery data. Personal service is a hallmark of all our professional support teams.

Our entire system is part of an integrated communications network linking our mills, production units, technical personnel and all warehouses.

TECHNICAL DATA

You can get instant access to technical data covering Carpenter's wide range of specialty alloys from anywhere in the world, 24-hours-a-day, at [www.cartech.com](http://www.carttech.com). Registration is fast and free.

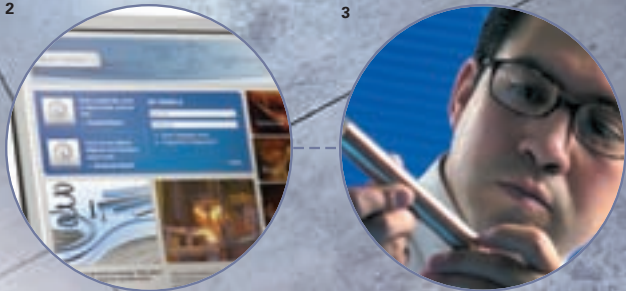
LEADERS IN SALES, SUPPLY CHAIN OPERATIONS AND TECHNICAL

❶ Filling orders promptly, our entire sales team is part of an integrated communications network, linking them to the mill, production and technical personnel. ❷ Searchable alloy data is available online in Carpenter's Tech Center at www.carttech.com ❸ Regional metallurgists, available through Carpenter service centers, can provide personalized metallurgical consultation when required. ❹ Carpenter-managed distribution centers can provide a range of advanced supply chain services, such as vendor-managed inventory, customized finishing services and specialized packaging, all from a single location.





SUPPORT



QUALITY PRODUCTS
SERVING HIGH TECHNOLOGY MARKETS



Carpenter, a world leader in the development, manufacture and distribution of specialty alloys, serves the global marketplace in the automotive, aerospace, energy, medical, industrial, consumer, and defense industries.

AEROSPACE

Carpenter offers a wide selection of aerospace (iron-nickel-cobalt-base) alloys. These versatile materials have been used in such elevated temperature applications as aircraft engine components, fasteners and landing gear. They have also been used in environments demanding corrosion resistance and high strength at elevated temperatures.

DEFENSE

Carpenter materials for defense are manufactured to combine properties such as high-strength, high toughness, and corrosion and wear resistance in a single alloy. Whatever the need – from landing gear, engine parts, or fasteners; to armor plate for aircraft, land vehicles, and personal protection; to vehicle suspension systems – you count on Carpenter alloys to perform.

CONSUMER GOODS

Carpenter alloys have been used in a broad range of durable consumer goods, such as control devices, pressure-balancing valves for appliances, and a variety of sporting goods including golf club faces.

ELECTRONIC

The unique, highly specialized characteristics of Carpenter magnetic, controlled-expansion, glass-to-metal sealing and special purpose alloys require exacting quality during manufacture and have been used in a broad spectrum of electronic circuitry and components.

AUTOMOTIVE

Carpenter is a leader in automotive alloy development, offering alloys with superior strength-to-weight ratios, machinability, corrosion resistance and long service life. Our alloys have been used in applications such as bearings, gears and engine valves. Carpenter alloys have also provided the performance and dependability required in such precision parts as automotive engine bolts, exhaust and braking systems and fuel injectors.

MEDICAL

Carpenter specialty alloys have been used in medical applications ranging from hand instruments to advanced electronic diagnostics equipment and medical implants in the fields of orthopedics, cardiology, general surgery, microsurgery and orthodontia.

INDUSTRIAL EQUIPMENT

Carpenter produces a wide variety of stainless steels and tool and die steels. Each grade is produced to meet specific performance requirements for manufacturing all types of industrial equipment and tooling. Applications have included bearings, fittings and valves.

POWER GENERATION

Our specialty alloys have performed under the high temperature environments, corrosive conditions, and operating stresses in gas and steam turbines of fossil and nuclear power generation facilities.

PETROLEUM PROCESSING

Carpenter specialty metals, which have been used in drill collars and fittings, are produced to withstand the harsh, corrosive environments found in chemical and petroleum processing industries.



MELTING TECHNIQUES



MILL FACILITIES

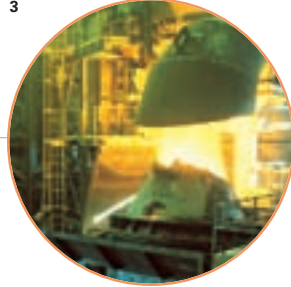
MELTING TECHNIQUES

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Carpenter's melting capabilities represent some of the most advanced in the steel industry. Alone or in combination, Carpenter's various melting methods make it possible to produce products that meet technically demanding requirements.

We operate electric arc furnaces, argon-oxygen refining vessels, vacuum induction melting furnaces, vacuum arc remelting furnaces, electroslag remelting furnaces and an air induction melting furnace. For efficient production, we also utilize continuous casting where feasible.

Throughout the critical stage of melting, exact composition is assured by chemical analyses. Highly skilled operators carefully monitor equipment to regulate melt time and temperature. And we employ the most up-to-date teeming and ingot molding methods, all to provide the lot-to-lot uniformity, consistency and metallurgical integrity our customers require.



Electric arc furnaces are used to initially melt the carefully balanced scrap and alloy charge into molten metal. Then Carpenter mill operators transfer the unrefined melt from the electric arc furnace into an argon-oxygen decarburization (AOD) vessel. There, a mixture of argon and oxygen is blown through the melt to release unwanted carbon and to facilitate final

chemistry refinement. The molten metal is poured into individual (static) molds to be remelted or hot worked later or is immediately tapped into the continuous caster.

Electric arc melting, combined with argon-oxygen decarburization, produces many specialty grades including stainless alloys.

❶ Bottom pouring reduces surface and subsurface ingot defects. ❷ Carpenter's modern testing facilities help the melt shops produce alloys that meet stringent requirements for chemistry and purity. ❸ Argon-oxygen decarburization removes unwanted carbon, resulting in a product of higher purity. ❹ Carpenter taps its largest electric arc furnace into a transfer ladle for delivery to an argon-oxygen decarburization vessel.



Continuous casting complements Carpenter's melting process by facilitating efficient billet production.

1



melting techniques



2



3



❶ Carpenter's continuous caster simultaneously casts two strands from a single heat, increasing efficiency and improving order lead-time. ❷ Continuous casting features electro-magnetic stirring to ensure consistent alloy mix and refined grain structure in the resulting billet. ❸ The strands are extracted from the caster, straightened and cut to specific lengths by a traveling torch.

Continuous casting allows molten steel from the argon-oxygen decarburization vessel to be formed into billets in one efficient operation. A ladle delivers the melt to the caster, where a pair of hot strands are extracted, solidified, straightened and cut to specific lengths by a traveling torch.

The process carefully integrates electro-mechanical sensors, computer-controlled systems and production planning to provide a highly automated operation.

The process of continuous casting achieves improved yield for grades that can be produced by this method.

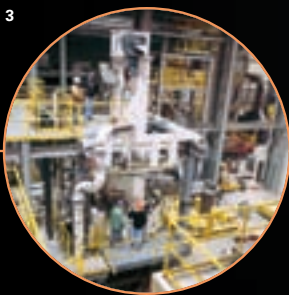
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❶ Heats processed in vacuum induction furnaces are melted and poured in the absence of atmospheric contaminants. ❷ Closely controlled and monitored conditions are essential to a successful melt. ❸ Carpenter's 20-metric-ton vacuum induction melting furnaces are among the most advanced VIM facilities in the world for melting premium grade specialty alloys. ❹ Molten metal remains under vacuum throughout the teeming process to maintain product purity.

2



3



4



melting techniques

Carpenter employs vacuum induction melting furnaces for demanding applications that require higher purity, ultra-premium alloys. To better maintain an alloy's chemistry and ensure consistent structural properties,

Carpenter invested in state-of-the-art melting facilities that feature some of the most advanced vacuum induction melting technologies in the world.

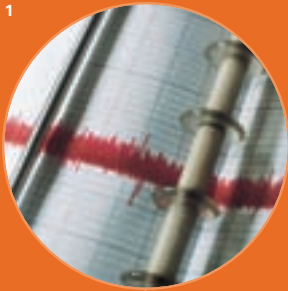
These technologically advanced, VIM-produced alloys, including

nickel-base alloys, are in great demand worldwide and have been used for turbine disks for jet engines and land-based gas turbines for the power generation industry.

Vacuum Induction Melting (VIM) produces alloys with improved cleanliness and homogeneity, resulting in higher ductility, improved impact strength and fatigue resistance.

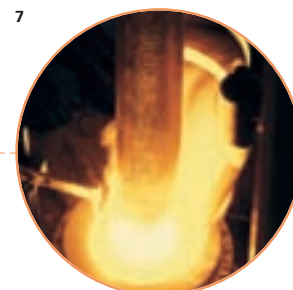
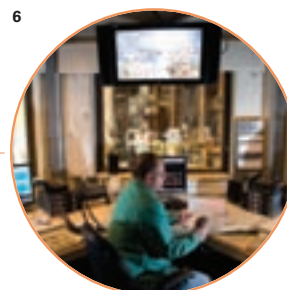


①② Carpenter technicians precisely control vacuum arc remelting (VAR) processing parameters to reduce gases and nonmetallic impurities. ③ Carpenter boasts one of the largest concentrations of VAR furnaces in the industry. ④ Refinement in VAR furnaces creates a finer, more uniform grain structure in the resulting ingot.



4





⑤ Carpenter possesses both static-mold and unique moving-mold ESR furnaces. ⑥ Careful control of the melting process ensures the fine grain structure of the finished ingot with ESR. ⑦ Our ESR capabilities produce metals of high purity with fewer inclusions, more uniform grain structure and improved mechanical properties.

To meet the global demand for specialty alloys, Carpenter employs one of the largest concentrations of modern VAR furnaces anywhere.

Our vacuum arc remelting process creates a finer, more uniform grain structure in the resulting ingot. Precise computer controlled systems

reduce gases and other nonmetallic impurities.

Carpenter also employs electroslag remelting furnaces, which result in metals of higher purity, improved mechanical properties and a more uniform grain structure of the final ingot.

melting techniques

Many alloys that have been used for aerospace and other critical applications are produced using a combination of VIM, ESR and VAR (triple melt) processes, the highest quality premium melted products to date.



❶ In addition to the P/M mill forms produced in Carpenter facilities, these alloys are available as loose powder or as hot isostatically pressed compacts. ❷ Carpenter powder alloy manufacturing begins with gas atomizing of molten metal to produce a pre-alloyed metal powder. ❸ A metallurgist uses a scanning electron microscope to obtain chemical analyses and images of Carpenter alloys at up to 200,000x magnification. ❹ Carpenter Powder Products has the largest pre-alloyed gas atomization production capacity in the world.

* MICRO-MELT IS A REGISTERED TRADEMARK OF CRS HOLDINGS, INC., A SUBSIDIARY OF CARPENTER TECHNOLOGY CORPORATION.

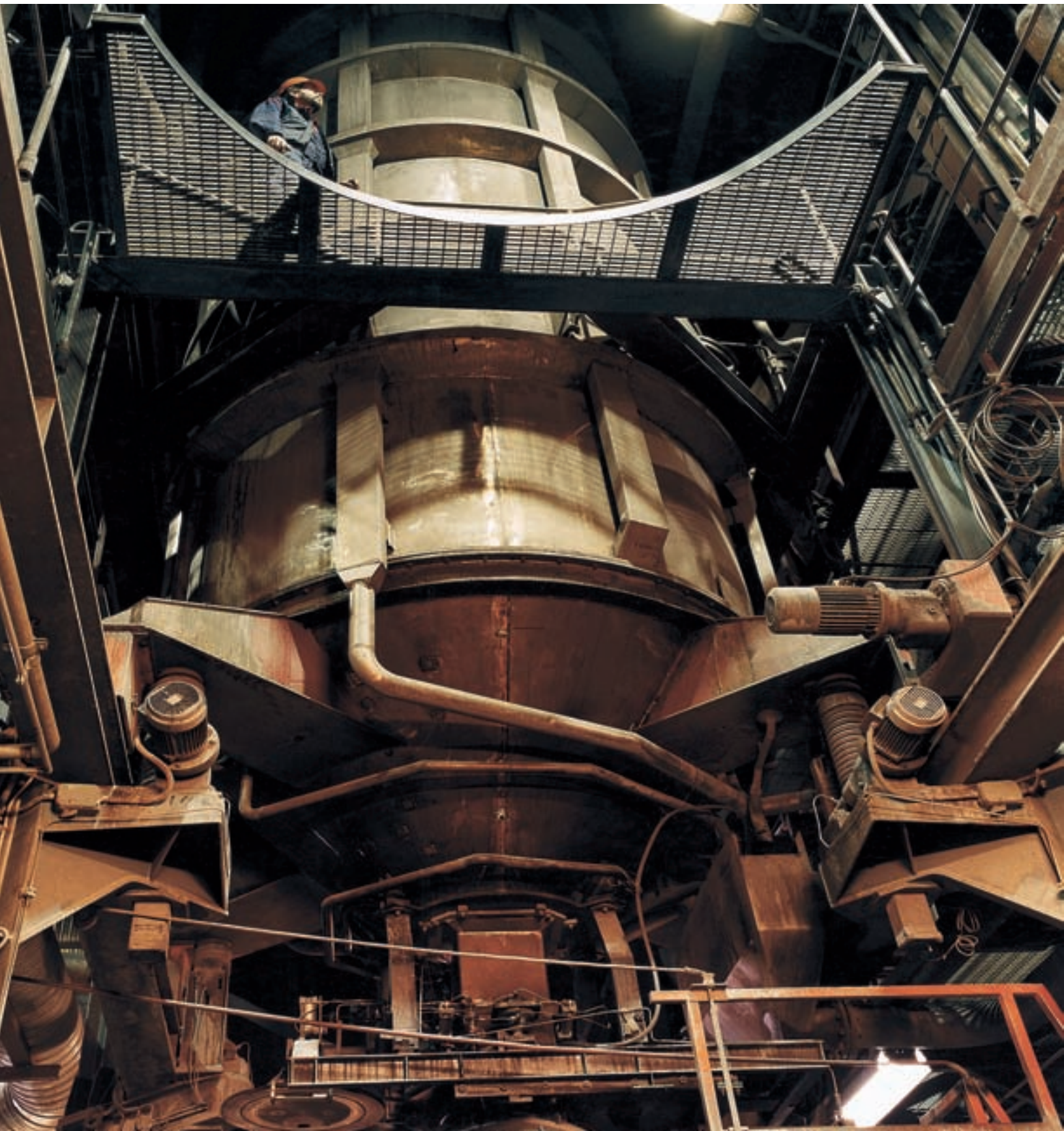
Powder alloys are produced by using a high-pressure gas to break up a molten metal stream into droplets, which rapidly solidify into powder alloy particles. The resultant powder is hot isostatically pressed into billet form, then hot worked and cold finished into bar, coil or other mill forms. Powder metal mill forms offer superior performance to cast/wrought mill forms for certain applications due to their more uniform, fine grain structure.

Customer benefits may include improved machinability, heat treating response, and improved corrosion and/or wear resistance when they use Carpenter powder alloys to manufacture their end-use products.

melting techniques



Micro-Melt[®]* powder alloys can be considered as candidates for tooling and medical applications.



HEAT TREATMENT AND BILLET CONDITIONING

1



2



3



MILL FACILITIES

HEAT TREATMENT AND BILLET CONDITIONING

To further enhance physical and mechanical properties, Carpenter employs heat treatment and billet conditioning processes at designated stages of steel production.

Of the two major types of heat treatment, full annealing serves to soften material for further working, to impart desired mechanical or physical properties or to produce a definite microstructure. The second type of treatment, hardening, includes quick cooling (quenching) and tempering (reheating slightly) to impart the desired combination of hardness, toughness, strength and microstructure.

Carpenter's furnaces can perform a variety of heat treating processes utilizing both batch and continuous furnaces and open or protective atmospheres for all product forms including strip, bar, wire, billet and plate.

integrity

❶ Many wire annealing furnaces contain protective atmospheres to prevent surface oxidization. ❷ This modern billet conditioning cell includes a powerful fixed head grinder and two-head abrasive saw. ❸ Our bell annealing furnaces are designed to help increase strip annealing capacity, anneal coils more economically and allow the mill to do more specialized heat treatment for specific customer requirements.

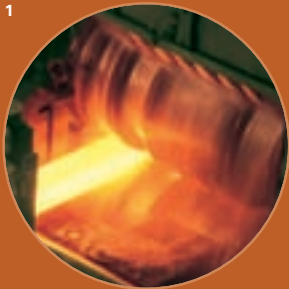
Carpenter's billet conditioning operations identify and remove surface defects, such as scale, surface cracks and nonmetallic inclusions. A billet conditioning cell streamlines several distinct operations into one continuous process. Billet conditioning also

performs ultrasonic inspection and cuts samples for further evaluation.

These operations help to ensure product quality as large ingots and billets are readied for remelting or hot working.



HOT WORKING SPECIALTY ALLOYS



MILL FACILITIES

HOT WORKING

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After melting, large ingots must be hot worked into smaller cross-section billets or rounds for further processing. During hot working, Carpenter specialty alloys are heated, then either forged, pressed or rolled into smaller cross-section sizes and shapes.

Our 4500-ton forging press hot works larger cross-section billets efficiently, reducing manufacturing steps and lead times as well as imparting improved metallurgical properties.

Carpenter’s lineup of hot working equipment includes two world-class rotary forges, an SX-65 and an SX-32.

Hot rolling is the transformation stage for Carpenter specialty alloys, where billets and ingots begin to assume their final form. In hot rolling, billets are reheated, then pushed through a series of rollers to bring the diameter of the product closer to finished size.

Synchronized through computer systems, the advanced process technologies of our hot mills make it possible to produce a wide range of product forms and sizes, especially in the difficult-to-roll grades.

efficiency

2



Carpenter's computer-controlled 4500-ton hydraulic forging press more efficiently and effectively hot works larger diameter and difficult-to-forge alloys, reducing lead times and improving quality and reliability.

The forging press maintains consistent quality with minimal variation from one forged section to the next of a similar size, shape and composition.

3

❶ Cogging is the initial breakdown of an ingot into a billet. Rolls move the billets through a series of progressive reductions. ❷ Pressure on the rolls is computer controlled for more precise cogging and repeatable results. ❸ Carpenter's 4500-ton hydraulic forging press is flanked by two integrated, open-jawed manipulators, allowing for product to be pressed over its entire length.



1



- ❶ With pairs of hammers that can deliver 175 strokes per minute and operate independently, Carpenter's SX-65 rotary forge can produce a total force up to 1400 tons. ❷ One of many benefits of rotary forging is the ability to produce nearer net finished shapes, such as multi-diameter bars. ❸ The smaller SX-32 rotary forge delivers up to 330 strokes per minute and produces a total force of 600 tons. ❹ This 62-foot-diameter rotary hearth furnace maintains seven temperature zones to accurately heat ingots and billets for the SX-65.

hot working

rotary forges can produce a wide range of product forms and sizes.

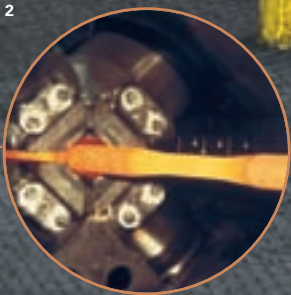


Carpenter uses two world class, computer-controlled rotary forges. Each utilizes a set of four hydraulic hammers that uniformly and precisely forge the work piece into the desired shape.

Carpenter's rotary forges produce a wide range of product forms, sizes and shapes—rounds, squares, and multi-dimensional bars—particularly in difficult-to-forge grades.

The rotary forge process improves forging straightness, metallurgical properties and surface quality, and enhances process and dimension control.

With their high levels of automation and precision, Carpenter's forging operations enhance our ability to serve many industries.



Carpenter's hot rolling mills can roll large ingots



Hot mill rolling and cogging operations transform hot billets through a series of forming steps into products that can be further hot worked or sent to one of our cold finishing operations.

Sophisticated computer systems control the input and output signals of the production systems in our fully automated, in-line hot rolling bar and rod mills.

In Carpenter's in-line hot rolling mill, billets are heated in one of several batch or walking beam furnaces, then processed on a 2-high reversing mill.

The product is returned to its appropriate hot working temperature by induction heating, then hot rolled to size through a series of up to 16 mill roll stands.

Product from the in-line hot rolling mill can be air cooled or water quenched as needed. Depending on the alloy and end-use application, the hot rolled coil or bar can either undergo additional hot working or proceed to one of several cold finishing operations.

- ❶ Carpenter furnaces have computer tie-ins for scheduling and tracking materials.
- ❷ Designed by Carpenter, nine batch furnaces have the capability of heating material ranging from 19" round ingots to 5" squares.
- ❸ An induction heater assures the cogged work piece will be at the optimum temperature for rolling.
- ❹ From this point, hot metal travels through the finish rolling stands to become coiled product, or comes off the mill as straight bar.
- ❺ After cooling, straight length product is saw-cut to standard bar lengths and bundled for ease of handling.
- ❻ Hot rolled rod coils can be air cooled or water quenched to control alloy hardness.



and billets into bar and rod coil forms as well as hot band for strip products.



Carpenter's fully automated in-line hot rolling mills produce a wide range of product forms and sizes, including difficult-to-roll grades.



The heated billet travels through a series of automated roughing and finishing stands that simultaneously decrease the diameter and increase the length of the billet. The majority of Carpenter's mills are equipped with computer-synchronized stands that progressively increase the rate of speed further up the line, automatically compensating as the rod diameter reduces and its length increases.

As it reaches the final stand, small-diameter rod can approach speeds up to 5,000 feet per minute (60 miles per hour).

With sensors providing feedback to state-of-the-art technology that monitors and controls rod and wire roundness and size, the Carpenter control room technician makes only minor adjustments during the hot rolling process.

Skilled teams of hand mill technicians complement Carpenter's automated hot rolling processes by enabling us to hot work custom lots, unique shapes and unusual alloys.

The advanced process technologies in our hot rolling mills allow us to efficiently convert slab into strip and billet into bar, wire and rod, helping to satisfy our customers' needs.





❶ After material is heated, it proceeds through a series of rolls and becomes coiled rod. ❷ Here, a hot rolling mill produces alloys in strip form. ❸ Special shapes and custom lots may require hot rolling on one of several specialized hand rolling facilities. ❹ Carpenter's hot rolling facilities can produce rod coils, bar and hot band in hundreds of alloys.

hot working

COLD FINISHING SPECIALTY ALLOYS



MILL FACILITIES

COLD FINISHING

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Our finishing operations process large (forged) bar, bar, wire, fine wire and strip to customer-specified size, shape, hardness and finish.

Bars from the presses, rotary forges or hot mills, and coils of rod are straightened and finished to accurate tolerances and surface qualities. Carpenter's ability to cold roll or cold draw bar into near net shapes helps customers lower their machining and production costs.

Wire from the hot mills is shaved, cleaned, cold drawn and coated to customer specifications. Some wire may be cold rolled or cold drawn into near net shapes, allowing us to produce many of our alloys in a variety of shapes for special customer end uses.

Hot rolled strip is cleaned, surface ground, then cold rolled to specified thicknesses on computer-controlled mills, which continuously monitor the material for uniform gauge.

For applications requiring specialized shapes and physical properties, Carpenter provides multi-dimensional bars that may require specific machining capabilities such as hollow boring.

uniform finish

Our cold rolling and cold drawing shaped bar and wire facilities are capable of producing uniformly close tolerances that help customers achieve greater accuracy in their own operations. Each product type goes through its own unique finishing

process, specially designed to meet customer specifications.

Because of closely monitored processes, Carpenter shaped bar and wire products possess superior surface finishes, providing increased product quality.

Using a wide range of alloys, Carpenter produces shaped bar and wire products that provide our customers with lot-to-lot consistency for uniform part fabrication, improved machinability and lower fabrication costs.

❶ Carpenter shaped products can be configured to meet a wide range of requirements and specifications. ❷ Bar or wire may be cold rolled or cold drawn to a variety of shapes, bringing the material closer to the shape of its end-use application. ❸ Carpenter shaped wire provides lot-to-lot consistency for uniform part fabrication, increased shop-floor productivity and lower fabrication costs. ❹ Flat shaped wire is cold rolled on our Fenn mills to maintain shape and tolerance.







Carpenter bar products have been used for critical applications in the automotive, medical, power generation and petrochemical industries.

Carpenter utilizes advanced bar finishing and testing/inspection technologies.

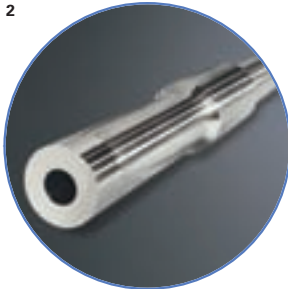
Carpenter operators turn, grind and draw bar products through automated, in-line processes that combine finishing operations such as cleaning, drawing and chamfering to increase efficiency and reduce lead times.

In Carpenter's specialized large-bar finishing operation, large diameter rounds from the rotary forge are lathe or centerless-bar turned, straightened, polished and cut to customer-specified lengths to meet customer requirements.



❶❷ In-line bar processing cells consolidate a number of finishing operations into one continuous flow. Computers monitor the process and provide SPC data. ❸ Carpenter's large-bar finishing capabilities include this centerless turner, which provides cost-effective surface removal, rivaling lathe-turned finishes. An in-line polisher can produce centerless-ground surface quality. ❹ In addition to visual inspection, all bar products undergo rigorous testing to verify product quality and customer specifications. ❺ This centerless bar turner installed in 2008 helps Carpenter finish large bars to exacting customer specifications.

Carpenter can machine, draw, roll, bore, hone



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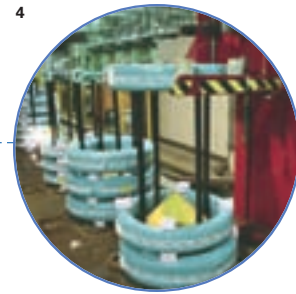
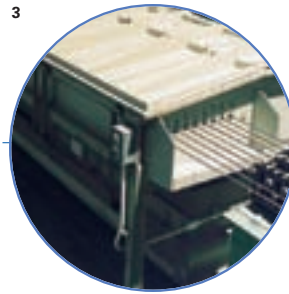
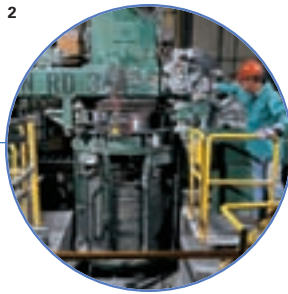
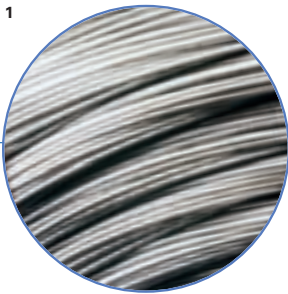
and mill bar and multi-dimensional bar in virtually all our grades.

cold finishing

❶ Carpenter's capabilities have included hollow bar, drill collars, multi-dimensional bars, special and near-net shapes and extrusion liners. ❷ Carpenter-produced drill collars have been used throughout the world in oil and gas exploration and drilling equipment. ❸ Technical expertise and precision equipment allow this facility to convert customer-owned black wire, wire rod and bar into "bright," precision tolerance, cold finished products.



Carpenter can produce hollow and multi-dimensional bars with inside diameters from 2 inches through 12.875 inches, outside diameters from 3.5 inches through 20 inches and bar lengths from 19 inches to 35 feet while maintaining close tolerances, concentricity and good finishes. Hollow bar machining capabilities include trepanning, honing, and OD turning.



cold finishing

5

In wire finishing, Carpenter has consolidated several finishing steps into a single, integrated process, increasing efficiency and maintaining quality standards.

These major upgrades in annealing, drawing, coating and packaging technologies and process controls give Carpenter one of the most sophisticated wire finishing facilities in the world.

Carpenter offers a variety of coating combinations to provide lubrication for most forming operations, including the most severe upsets and/or extrusions.

A state-of-the-art copper coating line offers a uniform, reliable lubricant for customers' cold heading applications.

From highly specific corrosion/heat resistant properties to electrical/expansion/magnetic properties, Carpenter can provide the right wire product to meet customer requirements.

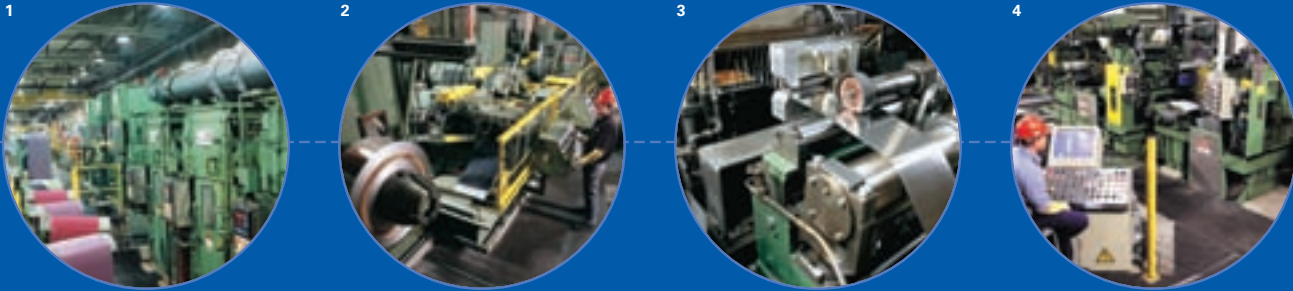
Carpenter provides a wide range of resistance, high temperature and stainless grades in fine wire and small shapes.



Carpenter wire products have been used in fasteners for such diverse industries as automotive, construction, aerospace, consumer products and industrial.

❶ Pattern-laid coil unwinds without tangling, kinking or twisting for improved wire payoff. ❷ Inverted drawing equipment permits larger wire coils and heavier weights, if required, with more uniform coil sizes. ❸ Strand copper-coating is an advanced process that imparts a far more uniform coating thickness of 100 micro inch with superior adherence. ❹ Carpenter designed innovative packaging techniques to complement customer receiving and manufacturing operations. ❺ This pickling line is one of a series of Carpenter equipment installations to hot work, anneal, clean and finish stainless products, helping modernize and streamline its stainless manufacturing process.





❶ The wet strip grinder enables the mill to increase productivity, increase capacity and improve strip surface quality. ❷ The stretch bend leveler improves the shape and flatness of precision specialty alloy strip less than 0.050" thick. ❸ Sendzimir* mills produce extremely light gauge, close tolerance strip that has been used in magnetic, controlled expansion and electronic applications. ❹ The precision slitter gives Carpenter precise slitting tolerances, improves edge quality and significantly expands slitting capacity. ❺ The 20-high reversing cold rolling strip mill improves productivity and provides superior shape and flatness, close tolerances and superior surface finishes.

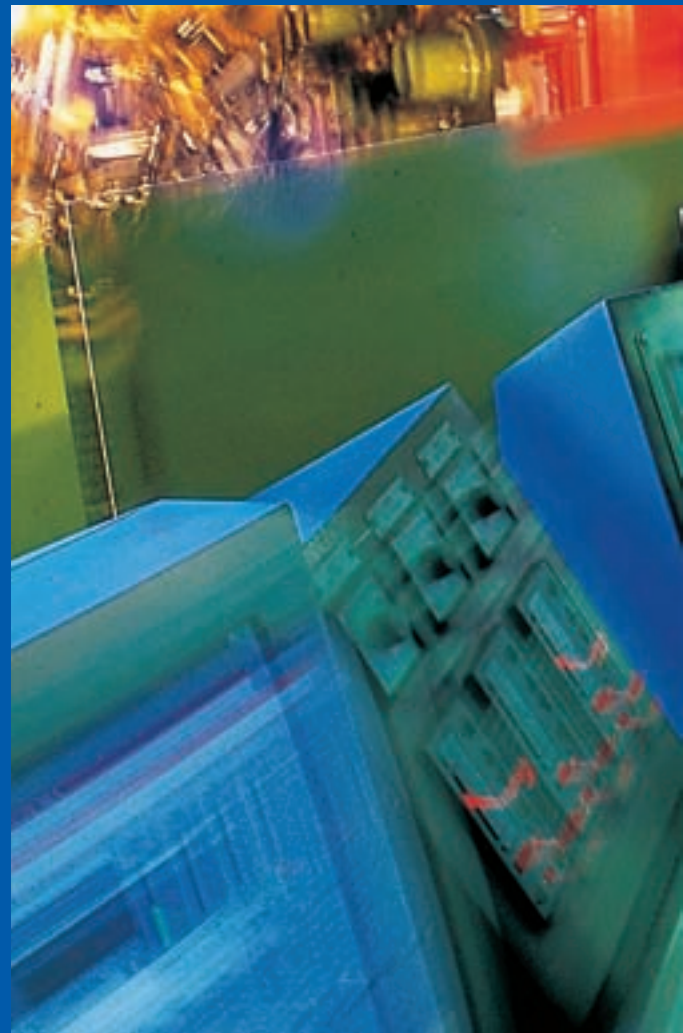
An \$80 million capital investment in the strip finishing mill virtually doubles Carpenter's strip manufacturing capacity and offers additional improvements in product quality, as well as shorter lead times.

Fully automated, in-line process controls reduce variation and improve product quality.

This sophisticated equipment allows us to produce precision specialty alloy

strip with superior shape and surface quality. The strip mill additions significantly increase production capacity as well as provide the capability to process more difficult-to-roll alloys such as high temperature alloys.

The mill has the capability to produce more alloys and sizes, providing our customers with more options than ever before.



* REGISTERED TRADEMARK OF TEXTRON, INC.

Carpenter's world-class strip finishing facility is among the most advanced, fully integrated precision specialty alloy strip mills in the world.





MILL FACILITIES

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Carpenter is dedicated to the development of new products and processes to support our customers and to increase our competitiveness worldwide. R&D is committed to technical leadership by developing not only evolutionary new products, but next generation specialty alloys, such as advanced nickel- and cobalt-based alloys, advanced stainless steels and high performance alloys steel to meet the needs of evolving technologies.

At Carpenter, Process R&D is striving to improve quality, reduce costs, and reduce energy consumption in all our processes. A state-of-the-art computational modeling group has been established to accelerate alloy and process development and deployment. Expanding R&D in powder metallurgy compliments numerous ongoing new product activities. These efforts are supported by a process laboratory that quickly produces developmental quantities of alloys in the cast/wrought and powder forms.

R&D has become a resource for our customers to find cost effective materials solutions to all their materials needs – our customers and their applications deserve nothing less.

innovation



1 Carpenter metallurgists and technicians conduct extensive tests to verify and enhance alloy properties for critical applications. 2 The environmental lab boasts a state-of-the-art Iris optical emission (plasma) spectrometer to analyze alloys, environmental samples and process baths. 3 Carpenter's process lab includes a 500-ton forging press to produce alloys for research studies. 4 This traditional chemistry lab—one of few in the metals industry—ensures the accuracy of element concentrations in Carpenter alloys.

In testing specific applications of specialty alloys, Carpenter's metallurgists use dedicated, state-of-the-art systems, such as 30-pound and 400-pound induction furnaces, and an inductively coupled plasma optical-emission spectrometer.

Carpenter strives to continuously improve quality, performance, machinability and strength to help customers meet tomorrow's challenges.

4



TITANIUM AND POWDER PRODUCTS

Besides specialty alloys, Carpenter produces a variety of engineered products.

A wide variety of powders are also available to energy and industrial markets. These powders have been used successfully in high temperature, corrosive and wear environments as found in industrial hot forming operations and on off shore oil rigs. Consumer market needs are served with CPP's UltraFine® powders for metal injection molding of many small parts and finished products.

POWDER PRODUCTS

Carpenter Powder Products (CPP) is a world-class manufacturer of Micro-Melt® and UltraFine® prealloyed gas atomized powder metal products, including stainless, nickel-, cobalt- and iron-base alloys, engineered to meet the unique performance and quality demands of aerospace, consumer, energy, medical and industrial applications.

CPP is a unique, integrated provider of powder metal alloys that have been

used in aircraft, land-based gas turbines and nuclear power facilities. Powder size and chemistry are tailored to meet process requirements for laser welding, thermal spray, metal injection molding, rapid prototyping, hot isostatic pressing, and high temperature brazing.

Standard and proprietary tool steel compositions are offered in powder form and as consolidated P/M tooling. These high performance tools are available in finished and semi-finished machined condition. CPP provides

P/M tooling to customer specifications for high-wear applications. Common uses include guides, arbors and rolls for mill applications.

Powders supplied to the aerospace industry include MCrAlY superalloys and high-temperature braze alloys. These metal powders are supplied to OEM specifications or to customized alloy and particle size requirements. Major processes employing CPP's powder metal products include laser welding, thermal spray and high temperature brazing.



For additional literature and information on tool steels and powder metal products, contact Carpenter Powder Products Inc., 600 Mayer Street, Bridgeville, PA 15017. E-mail CPP@cartech.com or call 1-866-790-9092 / 412-257-5102. Or visit us at www.carpenterpowder.com.



TITANIUM WIRE, SHAPES AND BAR

Dynamet, Carpenter's titanium subsidiary since 1997, has delivered quality and value in the production and distribution of titanium products, and today is clearly recognized as a world leader in this industry.

Titanium is being selected more often as the metal of choice for applications where corrosion resistance, light weight, strength and biocompatibility are important. Titanium has proven its versatility in a variety of industries and applications including aerospace fasteners and commercial and military airframes, chemical-processing and power-generation industrial fasteners,

artificial joints and trauma implants for medical, high-performance valves and springs for motorsports, and high-performance bicycle frames and seat rails and extreme sports gear for the sporting goods industry.

Dynamet serves these and many other markets through a complete line of coil and bar products of various shapes, sizes and diameters.

FINE WIRE

Dynamet's Fine Wire group serves the users of titanium who make small, but often critical, products from the metal prized for its light weight, strength and corrosion resistance.

You'll find our fine wire products in a wide variety of applications ranging from titanium weld wire to surgical suture wire. Because of our breadth of experience, we can offer a wide range of fine wire products that exhibit uniform consistency in mechanical and surface qualities and dimensional tolerance. Due to its remarkable biocompatibility, titanium is being used for orthopedic and orthodontic surgery in products including clips, staples, screws, plates and rods. Dynamet also leads the industry in producing Fine Wire for aerospace, automotive and commercial applications, as well as eyeglass frames and high-performance bicycle spokes.

For additional literature and information on titanium bar and wire products, contact Dynamet Inc., 195 Museum Road, Washington, PA 15301. Or call 1-800-237-9655 / 724-228-1000 or visit us at www.dynamet.com.



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