



## Leadership in Titanium Alloys



# DYNAMET READY TO MEET YOUR NEEDS

Dynamet Incorporated has grown to be a leading domestic and international supplier of titanium alloy products for the aerospace, medical, consumer, automotive and recreation industries. Dynamet is a subsidiary of Carpenter Technology Corporation, Wyomissing, Pa., a globally recognized specialty alloys manufacturer founded in 1889.

As a user of titanium specialty metal products, you demand and expect excellence in quality, service and value. As a supplier of titanium and other specialty metal products, Dynamet takes that responsibility seriously. Our goal is to provide you with the exacting materials you require at the best possible value. Dynamet's quality systems are approved to ISO 9001 and AS9100 standards.

Several key parts of our business help us meet your challenge. Dynamet's substantial research and development investments keep us focused on innovation and ways to continuously improve new and established products. DYNALUBE and Smart Coil® products, ULTRABAR™, precision shapes capabilities and Just-In-Time delivery services help customers increase their operating efficiencies and lower their costs.

For more than 40 years, Dynamet has been delivering excellence and innovation in the manufacture of titanium and other specialty metal products. That commitment to excellence extends to everything we do – from the way we answer the telephone to the maintenance of our plants. It's a commitment that extends throughout our workforce – a team of highly skilled people who are eager to satisfy your specialty metal needs.

Think of Dynamet as a partner in your success.

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# THE DYNAMET PROCESS

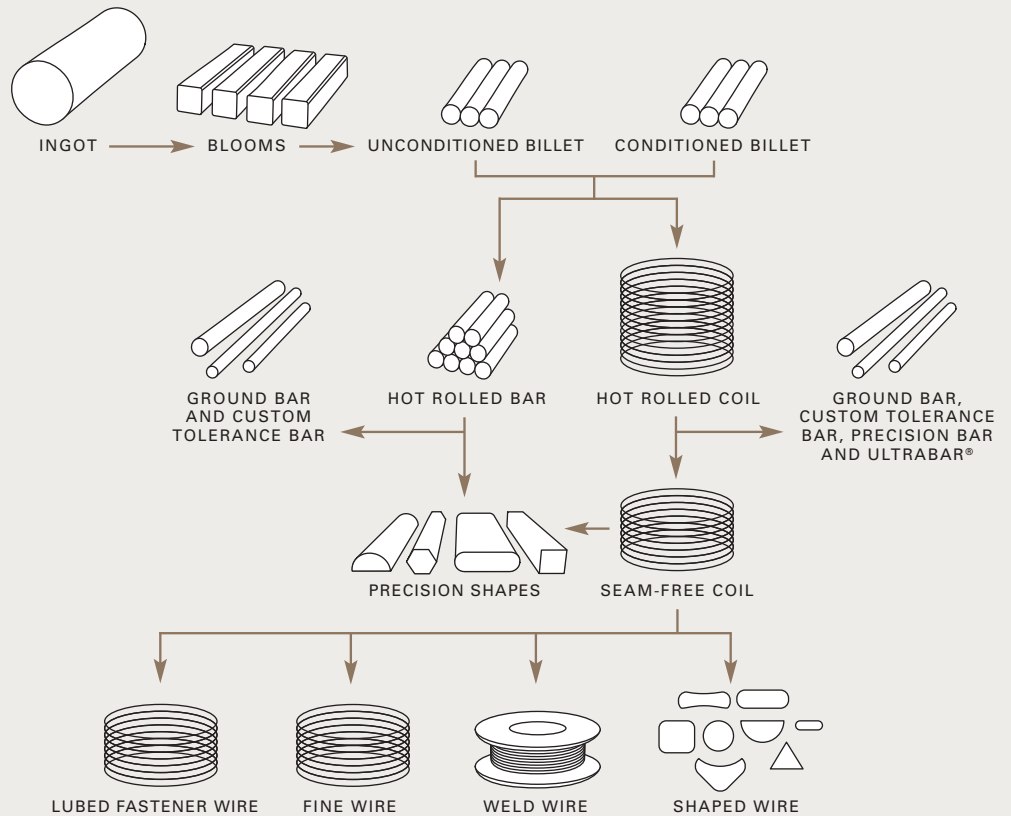
## TITANIUM ALLOYS

- Ti 15V-3Cr-3Sn-3Al
- Ti 3Al-2.5V
- Ti 3Al-8V-6Cr-4Mo-4Zr
- Ti 6Al-2Sn-4Zr-2Mo
- Ti 6Al-4V
- Ti 6Al-4V ELI
- Ti 6Al-4V ELI WW
- Ti 6Al-4V Rotor Quality
- Ti 6Al-6V-2Sn
- Ti 6Al-7Nb
- Ti CP Grade 1
- Ti CP Grade 2
- Ti CP Grade 3
- Ti CP Grade 4
- Ti Pd
- Ti Cb
- Ti 15Mo

**Quality starts at the beginning. Dynamet's processes begin with the purchase of titanium and other specialty alloys in ingot or bloom/billet form. Material is sourced from a select group of qualified global suppliers to meet Dynamet's specialized requirements which in turn is processed to meet precise customer and industry specifications.**

- Ingot is inspected, pressed and conditioned into blooms.
- Blooms are rolled to billets, conditioned and further processed through reduction mills into hot rolled bar or hot rolled coil.

- Hot rolled bar is annealed, straightened and processed to meet customer specifications for ground bar, custom tolerance bar, precision bar, ULTRABAR™ or precision shapes.
- Hot rolled coil is processed into seam-free coil, lubed fastener wire, or follows the path to fine wire, weld wire spools or straight lengths, shaped wire or precision shapes.
- Hot rolled coil can also be annealed, drawn, straightened and processed to meet customer specifications for ground bar, custom tolerance bar, precision bar, ULTRABAR® or precision shaped bar.



## SIZE CAPABILITIES

**Bar:** .078 – 3.00 inch diameter  
(1.98 – 76.20 mm)

**Wire:** .100 – .560 inch diameter  
(2.54 – 14.22 mm)

### Fine Wire & Weld Wire:

**Coil:** .040 – .125 inch diameter  
(1.02 – 3.17 mm)

**Spool:** .005 – .093 inch diameter  
(.13 – 2.36 mm)

### Cut Lengths:

.030 – .125 inch diameter  
(.76 – 3.17 mm)

**Shapes:** See page 7 for details.

### GROUND BAR

Dynamet standard ground bar has a centerless ground surface finish and other high integrity characteristics.

### CUSTOM TOLERANCE BAR

Custom Tolerance Bar offers customers tighter diameter and out-of-round tolerances compared to ground bar.

### PRECISION BAR

Precision Bar processing imparts improved surface finish, precise diameter and out-of-round tolerances that are significantly tighter than standard bar stock.

### ULTRABAR™ PRECISION BAR

ULTRABAR Precision Bar is an industry-leading, small-diameter machining bar that offers Dynamet's best dimensional characteristics and bar-to-bar consistency.

### FINE WIRE

Seam-Free Coil is finished into straight lengths, coil and spooled wire.

# COIL & BAR PRODUCTS



Dynamet's Ultimate Performance Grade (UPG®) material has helped propel our participation in the automotive and recreation markets. UPG titanium springs help champion snowcross racers cross the finish line first.

## You'll find Dynamet products in many applications including:

- Fasteners in the aerospace, chemical processing and power generation industries.
- Airframe components in commercial and military aircraft.
- Medical implants such as artificial joints, spinal fixation and trauma.
- High-performance engine components and springs in the automotive and recreation industries.

**The Dynamet name is synonymous with quality, innovation and customer satisfaction. In fact, design engineers rely on us for the highest quality titanium heading wire and machining bar products serving a wide range of high-performance applications in which light weight, strength,**

## **biocompatibility and corrosion resistance are important.**

Dynamet also provides innovative product and supply solutions to material and production problems including our industry standard heading wire products, Dynalube and Smart Coil® wire.

As a Dynamet customer, you can experience shorter mill lead times, excellent product quality, flexible order scheduling and delivery reliability. Moreover, we can produce to smaller mill minimums than most other mill product suppliers.

Titanium is often the chosen material for joint reconstruction procedures due to its light weight, biocompatibility and strength.



Dynamet has earned an international reputation as the premier supplier of titanium heading wire and bar to manufacturers of aerospace fasteners.

### DYNALUBE HEADING WIRE

Seam-Free Coil is pre-lubricated for heading operations, layer level wound and packaged on a spool in moisture-resistant wrap.

### SMART COIL® HEADING WIRE

This premium quality seam-free coil provides precision diameter tolerances, pre-lubrication for heading operations, and layer level winding and packaging on a spool in moisture-resistant wrap.

### PRECISION SHAPES

Shaped materials are near net shape, custom profiles and are produced in standard geometric shapes.

### SLIC

Coiled titanium with no permanent curvature suitable for high volume production of precision components where straightness and production efficiency are critical.

### HIGH STRENGTH TI 6Al-4V ELI

Dynamet uses a proprietary process to achieve enhanced mechanical properties for applications requiring greater strength.

# FINE WIRE PRODUCTS



Surgical clips made from CP (commercially pure) titanium have been used in vascular and organ transplant surgery.

**Dynamet's Fine Wire operations deliver titanium for small, but often critical, products from the metal prized for its light weight, strength and corrosion resistance.**

Dynamet Fine Wire products are found in a wide variety of applications, ranging from titanium weld wire to surgical suture wire.

Our breadth of experience enables us to offer a wide range of fine wire products that exhibit uniform consistency in mechanical and surface qualities as well as dimensional tolerance.

Weld wire is available as precision-level wound spooled wire or straightened and cut lengths, with optional flag tagging for

traceability. Dynamet welding wire products can be manufactured to AMS, AWS and ASTM specifications as well as individual customer specifications.

Thanks to its remarkable biocompatibility, titanium is frequently specified for orthopedic and orthodontic surgery in products including clips, staples, screws, plates and rods.

Dynamet products also are used for fashion eyeglass frames, which feature the lightweight characteristics of titanium and a wide range of anodized color options.



Fashion-conscious consumers seek out eyewear made from versatile titanium manufactured by Dynamet.

## INNOVATION IN DELIVERY AND CUSTOMER SERVICE

We are committed to on-time delivery, and personal, responsive service is a hallmark of all our professional support teams.

Carpenter Technology's network of strategically located warehouses and operations centers in North America, Europe and Asia enable Dynamet to serve customers around the world.

Skilled and responsive sales and service professionals can quickly and accurately track order status, inventory and other essential delivery data.

## PUT DYNAMET'S PEOPLE AND PRODUCTS TO WORK FOR YOU

Dynamet people, from sales to metallurgy to R&D, constantly search for new and better ways to use, process and fabricate titanium products. We foster that spirit of innovation and invention but temper it with a passion for the ultimate in quality.

Let us put our proven expertise, quality products and commitment to value-added service to work for you.

Eastern United States: 1-800-237-9655  
Western United States: 1-800-756-1535  
Europe (Belgium): +32-10-686-010

Dynamet bar products are also available through our parent company, Carpenter Technology Corporation. To reach the sales office nearest you, visit [www.carttech.com](http://www.carttech.com) or call:

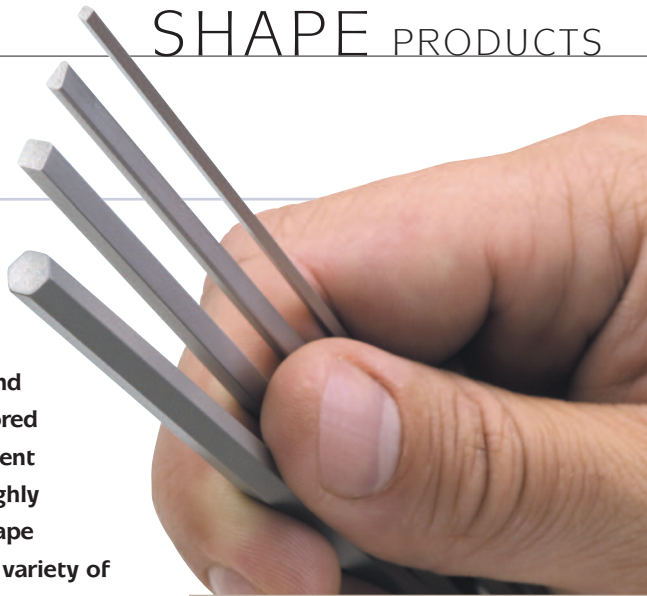
U.S.: 1-800-654-6543  
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United Kingdom: +44 (0)1789 767340  
Singapore: 65-6738-2401  
China: (86 21) 2411-3500

# SHAPE PRODUCTS

**Dynamet's Precision Shape Products capability is a unique and specialized process tailored to meet the most stringent requirements. These highly engineered near net shape products have served a variety of markets including medical, industrial, and recreational.**

Dynamet's proprietary process produces tighter dimensional tolerances than can be achieved with typical hot rolled titanium shapes. The combination of good squareness, close tolerances and superior surface finish in Dynamet's precision shapes permits manufacturers to eliminate qualification machining of parts and move directly to final machining.

Dynamet shapes can simplify the customers' processes of fixturing and clamping prior to machining. These advantages allow fabricators to save material, reduce machining time and improve yields.



Large or small, wire or bar, Dynamet can engineer shapes to meet the most precise applications.

## SIZE CAPABILITIES

(Cross Section)

### Rectangle or Square Shape

**Bar or Wire:** Up to 1.00 sq. inch  
(Up to 645 sq. mm)

### Hexagon Shaped Bar:

Up to .8125 inch  
(Up to 20.6 mm)

Dynamet shaped products are found in a variety of applications ranging from medical bone plates and spinal systems to high-performance racing bicycles.

Choose from a variety of titanium alloys including Ti 6Al-4V ELI, Ti 6Al-4V, Ti 6Al-7Nb, Ti 15Mo and Ti-CP (commercially pure) grades 1, 2, 3 and 4. Compositions and mechanical properties can be tailored to meet custom requirements.

Customers can specify rectangle or square shape bar or wire for machining applications. Bars are available in standard or custom cut lengths.

Complex net shape spinal fixation systems have been designed using Dynamet's Precision Shape products.

*Product photograph used with permission of Synthes*

## DYNAMET MATERIALS LABORATORY

**State-of-the-art testing equipment and techniques ensure accurate test results – when you need them. Whether testing titanium alloys, niobium alloys, steels, nickel-based alloys or cobalt-based alloys, it's all part of Dynamet Materials Laboratory's focus on meeting the needs of our customers.**

The Dynamet Materials Laboratory ensures strict quality control standards. The team of highly skilled technical staff perform physical, chemical and metallographic analyses on all raw materials to verify acceptable mechanical properties, levels of cleanliness, surface characteristics and chemical content.

The Dynamet Materials Laboratory performs the following tests:

- Room- and elevated-temperature tensile testing
- Stress rupture testing
- Carbon, sulfur, oxygen, nitrogen and hydrogen testing via combustion or fusion methods
- Full metallography services
- Heat treatment of test samples
- Machining of test samples
- Rockwell hardness testing

The Dynamet Materials Laboratory has been accredited by the National Aerospace and Defense Contractors Accreditation Program (NADCAP), General Electric S-400, General Electric S-1000, and Pratt & Whitney Commercial laboratory (MCL).

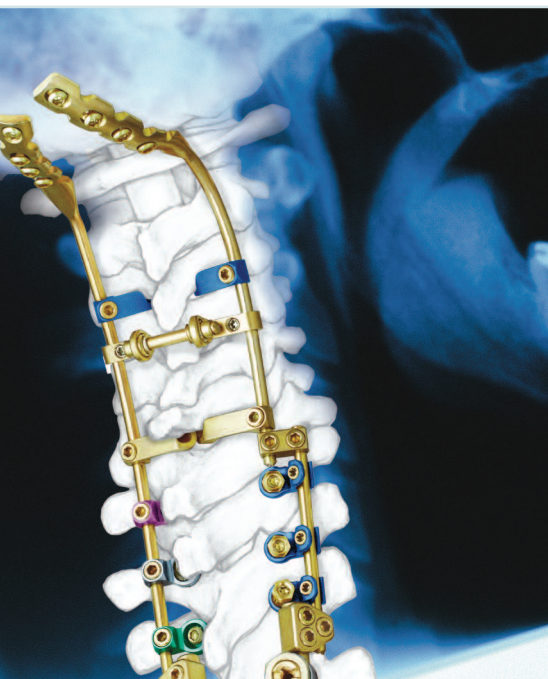
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