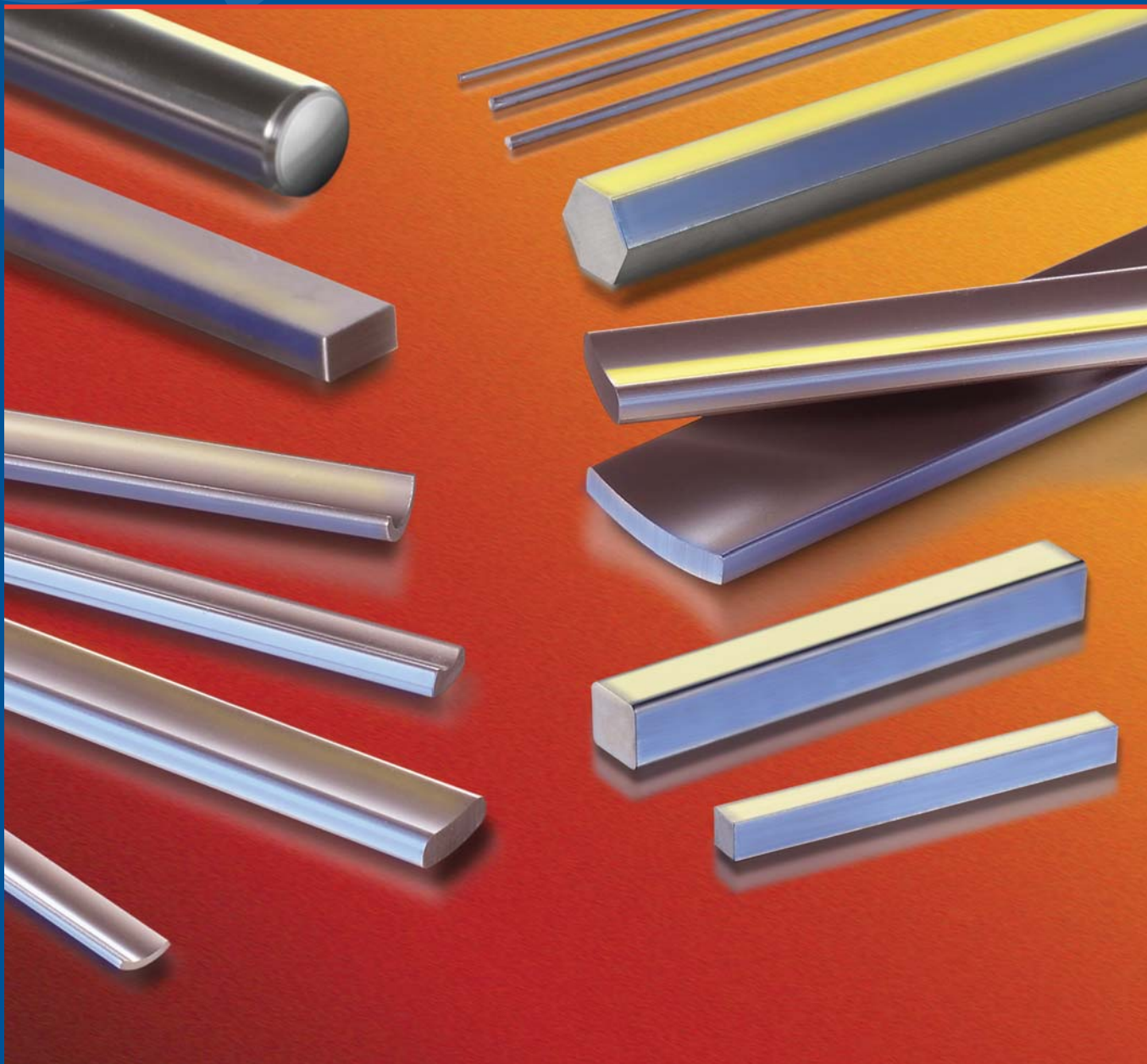


## Titanium for Medical Applications





## Serving the medical industry

For more than 30 years, Dynamet has been listening to the needs of the medical manufacturing community and responding with high-quality titanium bar, wire and shapes. In fact, much of the titanium raw material that goes into today's innovative medical products is produced by Dynamet. You won't find a materials company with more expertise in titanium and medical applications anywhere.

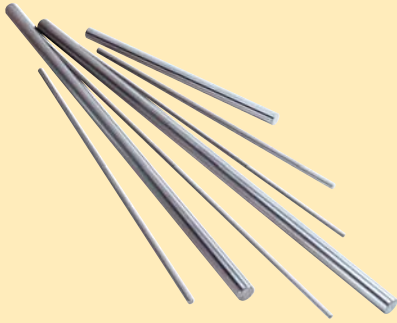
## Advancing medical product design

The finest medical systems call for materials that are strong, lightweight and biocompatible. Titanium is a material that meets all of these needs. It has been used extensively in applications from joint replacement, spine and trauma systems, to instrumentation and dental implants. Dynamet, a global leader in the supply of medical grade titanium, uses a collaborative approach to link the demands of the medical industry to innovative solutions in titanium. Titanium is the "metal of choice" for many medical applications and Dynamet is the company delivering titanium products of exceptional quality.

## A relentless focus on titanium

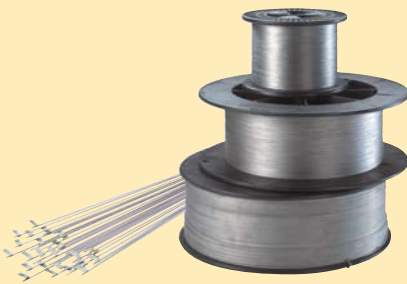
Our success can be attributed to a focus on constant innovation and technology development. It's this focus that makes us an undisputed industry leader. For example, we were one of the first companies to consistently achieve tight tolerances and superior finishes in small diameter bar, wire and precision shapes in titanium and other specialty alloys. As a result of these and other improvements, Dynamet has become an innovation leader and the standard for quality in the medical industry.





### Bar and coil products:

- Some of the many applications where these forms have been used are artificial joints, trauma implants, instrumentation, staples and cardiovascular applications
- Forms include coil, precision wound spools and acid etched, centerless ground, custom tolerance and precision bar
- Available in a multitude of shapes and sizes
- Finished bar diameters from .020" (.508 mm) to 2.875" (73.00 mm)
- Finished wire diameters from .005" (.127 mm) to .560" (14.22 mm)



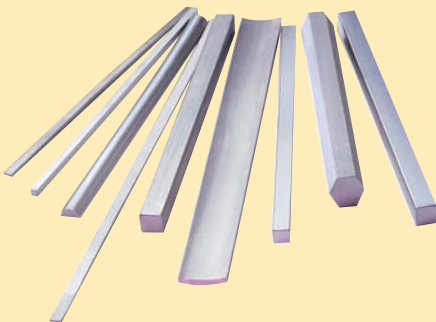
### Shaped products:

#### Squares, rectangles and custom engineered shapes

- Some of the many applications where these forms have been used are spinal fixation systems, bone plates and instrumentation
- Shapes save material, reduce machining time, boost efficiency by using stock close to desired net shape
- Squares and rectangles available in widths from .015" to 1.000" (.381 mm to 25.40 mm)
- Custom engineered shapes available in widths to 1.700" (43.18 mm)
- Available in thicknesses to 1.000" (25.40 mm)
- Tight dimensional tolerances

#### Hex bar:

- Found in systems where a hex head or wrench flat is needed
- Available in sizes from .125" (3.17 mm) to .812" (20.62 mm)
- Tight dimensional tolerances
- Angles precisely 60°



The information and data presented herein are typical or average values and are not a guarantee of maximum or minimum values. Applications specifically suggested for material described herein are made solely for the purpose of illustration to enable the reader to make his/her own evaluation and are not intended as warranties, either express or implied, of fitness for these or other purposes.



## DYNAMET TITANIUM BAR PRODUCTS

Size Ranges	Type	Diameter Tolerance	Surface Finish
.020" rd - .079" rd (.50 mm - 2.02 mm)	Acid Etched	± .001" (± .025 mm)	n/a
.080" rd - .125" rd (2.03 mm - 3.17 mm)	Acid Etched Centerless Ground Custom Tolerance	± .001" (± .025 mm) ± .001" (± .025 mm) to ± .0004" (± .010 mm)	n/a 64 μ in. Ra 64 μ in. Ra
.126" rd - .499" rd (3.18 mm - 12.67 mm)	Centerless Ground Custom Tolerance Precision Bar	± .0005" (± .013 mm) to ± .00025" (± .006 mm) ± .00015" (± .004 mm)	64 μ in. Ra 64 μ in. Ra 40 μ in. Ra
.500" rd - .999" rd (12.70 mm - 25.30 mm)	Centerless Ground Custom Tolerance	± .001" (± .025 mm) to ± .0004" (± .010 mm)	64 μ in. Ra 64 μ in. Ra
1.000" rd - 1.500" rd (25.40 mm - 38.10 mm)	Centerless Ground Custom Tolerance	± .002" (± .050 mm) to ± .0004" (± .010 mm)	64 μ in. Ra 64 μ in. Ra
1.501" rd - 2.875" rd (38.10 mm - 73.00 mm)	Centerless Ground Custom Tolerance	± .003" (± .076 mm)" to ± .0004" (± .010 mm)	64 μ in. Ra 64 μ in. Ra

### Comments:

- Acid Etched Bar: Seam-free mill finished bar
- Centerless Ground Bar: Standard defect-free, centerless ground (CG) bar used for general purpose machining applications
- Custom Tolerance Bar: Custom made, tighter tolerance and better out-of-round (OOR) than standard CG machining bar and defect-free.
- Precision Bar: Premium, quality defect-free machining bar for precision screw machine applications with the best surface finish, tight tolerances and straightness

### Notes:

- Other surface finishes available upon request
- Line marking and chamfering available upon request
- OOR tolerance is half of the diameter tolerance
- Straightness is to AMS 2241 standard of .0625 in. (1.58 mm) in 5 ft. or better

## DYNAMET COILS AND SPOOLS

Wire Product	Size Range	Standard Tolerance	Custom Tolerance
Turned and Polished	.110-.560" (2.79-14.22 mm)	+/- .001" (+/- .025 mm)	+/- .0004" (+/- .0101 mm)
Coils (acid etched)	.030-.187" (.76-4.75 mm)	+/- .001" (+/- .025 mm)	+/- .0005" (+/- .0127 mm)
Spools	.007- .125" (.18-3.18 mm)	+/- .001" (+/- .025 mm)	+/- .0005" (+/- .0127 mm)

## GRADES AND SPECIFICATIONS

Grades	Specifications
Ti 6Al-4V	ASTM F 1472, ASTM B 348 Gr5, ISO5832-3
Ti 6Al-4V ELI	ASTM F 136, ASTM B 348 Gr23, ISO5832-3
CP Grade 1	ASTM F 67 Gr1, ASTM B 348 Gr1, ISO5832-2
CP Grade 2	ASTM F 67 Gr2, ASTM B 348 Gr2, ISO5832-2
CP Grade 3	ASTM F 67 Gr3, ASTM B 348 Gr3, ISO5832-2
CP Grade 4	ASTM F 67 Gr4, ASTM B 348 Gr4, ISO5832-2
Ti 6Al-7Nb	ASTM F 1295
Ti 3Al-2.5V	ASTM B 348 Gr9
Ti 15Mo	ASTM F 2066

Available in all forms.



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