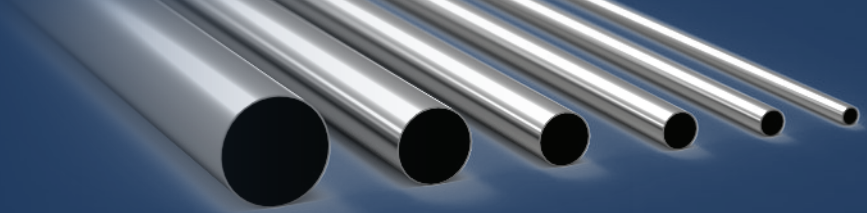


# Nitinol Tubes

## EXPERTISE YOU CAN COUNT ON



**Challenge our team** of metallurgists and process engineers at our Tubing Center of Excellence in Collegeville, PA with your tube specification to experience our **world class tube making** capabilities. Viant's metallurgists have decades of experience and are backed by an extensive in-house metallurgical laboratory to ensure the highest quality with optimized performance and cost.

We have **a long and proud heritage** in tube drawing, serving customers with the most challenging tubing applications in the world. Our history in precision tube manufacturing dates back over 80 years, with our **founding in 1940** as Uniform Tubes.

We **extended our tube drawing skills to nitinol** starting in 1999. Our nitinol product offering now covers an OD range from .050 inch (1.27mm) to .400 inch (10mm) with wall thickness ranging from .004 inch (0.1mm) to .035 inch (0.89mm).

Viant produces **over 100,000 feet** of nitinol tubes annually, the majority being for peripheral stent applications.

Viant also produces a wide range of both seamless and welded and drawn tubes for implantable and instrumentation applications. **Available alloys include:**

- Superelastic Nitinol
- Stainless steels—304, 316, 316 LVM and 17-7ph
- Titanium grade 2 and grade 9 (Ti 3Al, 2,5 Ti)
- Cobalt alloys—MP35N and L-605 (alloy 25)
- Other implantable alloys—Niobium and Tantalum

## Precision Nitinol Tubes

Our nitinol tubes are created using processes that produce the best dimensional control and highest quality surface finishes.

- Viant's drawing process uses hard ID tooling during drawing and optional OD grinding to finish size.
- To minimize wall thickness variation due to concentricity, raw materials are precision gun drilled and tube wall thickness is inspected 100% using ultrasonic techniques.
- Tube dimensions are measured and control charted when drawing in-process and at finish size.
- OD and wall thickness can be measured and reported statistically as required by the customer.
- Viant currently offers SAES material with reduced inclusion size and quantity versus the standard SAES product offering.
- ATI material will be available soon.

## Ship from Stock

Viant offers a range of stock nitinol tubes for shipment via Chamfr®. Available sizes are listed in the table.

### Order online:

<https://chamfr.com/sellers/viant>

## Rapid Prototypes (coming soon)

Viant also offers rapid prototypes in ATI material. Tubes are drawn and finished to your specification and shipped within 4 weeks.

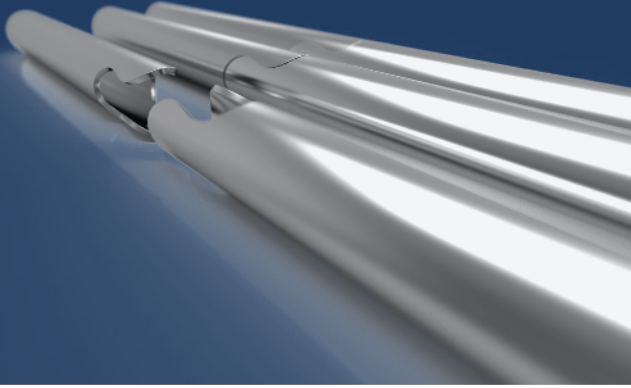
Finished Item Number	OD <sup>1</sup> (inch)	OD Tolerance (+/- inch)	ID (inch)	ID Tolerance (+/- inch)	Wall Thickness (reference) <sup>3</sup>	Concentricity (% of wall thickness) <sup>2</sup>	Length (inch)
311728	0.248	0.002	0.2	0.002	0.024	10%	36
311730	0.178	0.002	0.144	0.002	0.017	10%	36
311732	0.128	0.002	0.104	0.001	0.012	10%	36
311734	0.093	0.0015	0.076	0.001	0.0085	10%	36
311736	0.068	0.001	0.056	0.001	0.006	10%	36
311738	0.048	0.001	0.04	0.001	0.004	10%	36

**Note 1** - Tube OD is ground, Tube ID is oxide free

**Note 2** - Concentricity is measured and reported per ASTM F2633

**Note 3** - Custom order tubes are available with OD and Wall thickness controlled for peripheral stent applications.

# Nitinol Tubes



## Metallurgical Lab Capabilities

- Metallographic Evaluation – ASTM E45 & E112
- Bend and Free Recovery – ASTM F2082
- Differential Scanning Calorimetry (DSC) – ASTM F2004
- Cyclic Tensile Testing – ASTM F2516
- Interstitial Element Analysis – ASTM E1941, 1409 & 1447
- Scanning Electron Microscopy (SEM)
- Elemental surface chemical analysis (EDS)

## Available Options

- Viant offers a tight range of active transformation temperatures within a manufacturing lot.
- Viant's drawing process can produce tubes with a shaped cross-section.



## Key Specifications

Viant's nitinol tubes meet or exceed ASTM specifications.

- All tubes meet the chemical and microstructural requirements of ASTM F2063.
- OD/W ratios are available from 3.5 to 40.
- Length 2–12.5 feet
- Straightness is .030 inch per foot max.
- All manufacturing is done in a ISO 13485 environment.

See the tables below listing standard properties, transformation temperatures, surface conditions and tolerances.

NITINOL TUBE CONDITIONS, DIMENSIONS AND TOLERANCES <sup>1</sup>					
Product	OD (in)	OD condition	OD tolerance <sup>2</sup>	Wall Tolerance	ID condition
Stents	.050 to .200	as-drawn	1% of OD	+/- 8% of wall thickness	oxide free
		ground	+/- .0005 in		
Valve Frames	.201 to .400	as-drawn	1% of OD	+/- 8% of wall thickness	oxide free
		ground	+/- .0007 in		

**Note 1** - Concentricity is 10% max measured by the method in ASTM F2633

**Note 2** - OD tolerance may be larger for tubes with high OD/W ratio

NITINOL TUBE TRANSFORMATION AND MECHANICAL PROPERTIES <sup>1</sup>		
Property	SAES Material	ATI Material
UPS at 3% strain (typ range)	60 to 70 KSI	60 to 70 KSI
UTS (min)	150 KSI	150 KSI
Uniform Elongation (min)	10%	10%
Permanent Set (max)	0.30%	0.30%
A sub s - fully annealed <sup>2</sup>	-30 to -15C	-35 to -15C
A sub f - finished tube <sup>3</sup>	-15 to -5C	-20 to +5C

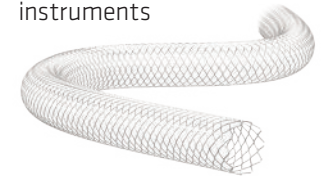
**Note 1** - Mechanical properties measured per ASTM F2516 - Cyclic tensile test

**Note 2** - Transformation temperatures measured per ASTM F2004 - DSC test

**Note 3** - Finished transformation may be tested per ASTM F2082 - Bend and Free recovery

## Applications

- Peripheral stents—arterial and venous
- Structural heart—Valve frames, delivery systems and atrial appendage closure devices
- Endo vascular support—IVC and EPD filters
- Flexible, minimally invasive instruments



## Our Commitment

Our team is focused on operational excellence:

- High Quality
- On Time Delivery
- The Right Cost
- Best in Class Lead Times

## Contact Us:

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