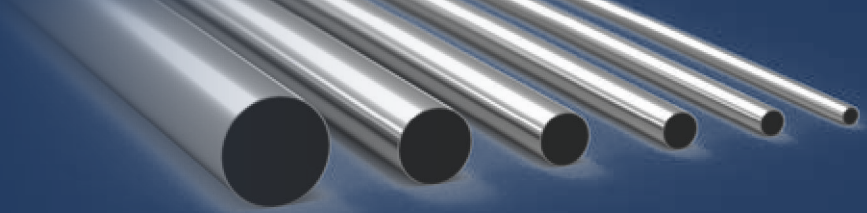


Nitinol Tubes

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.

Ship from Stock

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

Order online:

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

Finished Item Number	OD ₁ (inch)	OD Tolerance (+/- inch)	ID (inch)	ID Tolerance (+/- inch)	Wall Thickness (reference) ₃	Concentricity (% of wall thickness) ₂	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

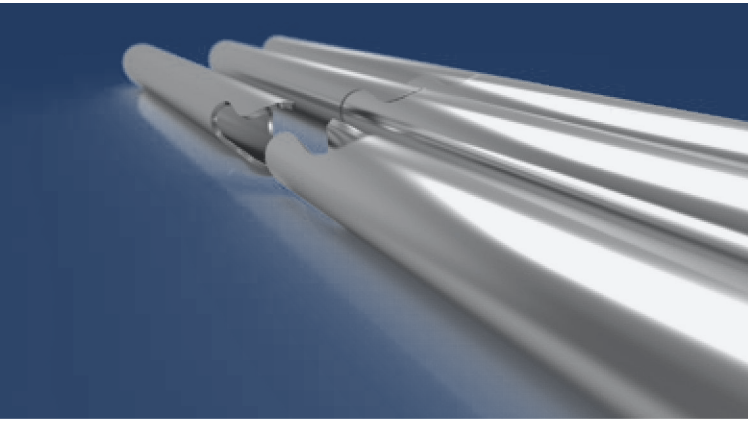
Note 1 - Tube OD is ground, Tube ID is oxide free

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 ¹					
Product	OD (in)	OD condition	OD tolerance ²	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 ¹	
Property	SAES Material
UPS at 3% strain (typ range)	60 to 70 KSI
UTS (min)	150 KSI
Uniform Elongation (min)	10%
Permanent Set (max)	0.30%
A sub s - fully annealed ²	-30 to -15C
A sub f - finished tube ³	-15 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

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