

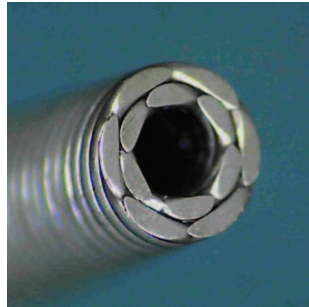
HHS® Tube



Fort Wayne Metals HHS Tube (Helical Hollow Strand) furthers our excellence in stranding and cabling of medical grade wire.

Features and Benefits

HHS Tube is a stranded wire with an open center working channel which can be constructed of numerous material types all drawn on site. HHS Tube designs are tailored to customer specifications of dimension, tension, compression, torque, and pitch direction while exhibiting high kink resistance and excellent whip free characteristics. Single, dual and triple layer HHS Tube can be manufactured for varying flexibility and control with differing filar counts and sizes per layer.



Dual layer HHS Tube shown

Applications

- Over the Wire Devices
- Manipulation Components
- Working Channels
- Endovascular Devices
- Minimally Invasive Tools
- Catheter Devices
- Delivery Devices
- Urological Tools
- Neurological Components
- Bioconductors

Specification

Helical Hollow Strands are designed using solid modeling according to mathematical formulas. Using parametric design, many design considerations can be evaluated in a short time. Materials are normally spring temper. Nitinol HHS is provided in the superelastic condition.

Flexibility can be influenced by design variables including ID, OD, Wire Size, Filar Count and other processing.

- Inside Diameter: 0.001" (0.0254mm) to 0.130" (3.302mm)
- Outside Diameter: 0.0025" (0.0635mm) to 0.160" (4.064mm)
- Filars 6 to 18
- Layers 1 to 3 (more may be available)
- Lengths from 1" to 10' (longer possible depending on design)
- Pitch Left, Right, Unidirectional, Reverse

Secondary Operations

- Customer specified performance testing:
 - Droop, Compression, Yield (elongation at load) or Torque
- Square cut ends
- Chamfering
- Formed HHS
- Welding
- OD Step Grinding
- Soldering
- Taper Ground
- Coatings (see spec sheet)
- Assembly

Materials (see specification sheets for more information)

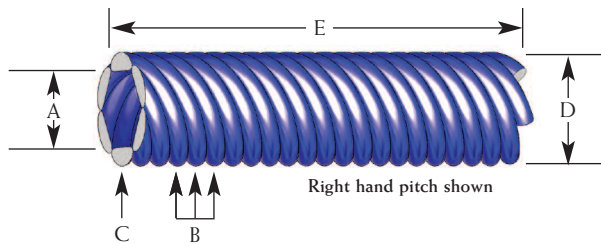
- 302
- 304V
- 316L
- 35N LT®
- DFT®
- L-605
- CP Titanium
- Ti 6Al-4V ELI
- Nitinol
- Pt Alloys
- (Others may be available)

Characteristics	HHS Tube	Coil	
		Unifilar	Multifilar
Torque	Excellent	Poor	Good
Windup (Low)	Good	Poor	Poor
Whip	Excellent	Excellent	Excellent
Pushability	Excellent	Excellent	Good
Use Tension	Excellent	Poor	Good
Compression (%)	Good	Excellent	Poor
Hoop Strength	Good	Excellent (Tight Wound)	Good
Wall Thickness (thinwall)	Good	Excellent	Excellent

HHS Tube General Parameters						
Parameter	Change	Flexibility	Pushability	Kink Resistance	Tensile Capability	Torque
Filar Diameter ¹	▲	▼	▲	▼	▲	▲
Filar Number ²	▲	▼	▲	▼	▲	▲
Inside Diameter ³	▲	▲	▼	▲	▼	▼
Material (Modulus)	▲	▼	▲	▼	—	▲
Drawn/Swage Secondary	OD▼	▼	▲▲	▼	▲▲	▲▲

Example: As the filar size (Filar Diameter) is increased (Change) there will be a loss in Flexibility and Kink Resistance but an increase in Pushability, Tensile Capability, and Torque.

Notes: 1.Results in longer lay (greater pitch), OD will increase 2.Results in longer lay (greater pitch), OD will remain constant 3.Results in shorter lay (shorter pitch), OD will increase



Single Layer HHS Tube Description:

	A	B	C	D	E
	Inside Diameter	Number of Filars	Filar Diameter	Outside Diameter	Length
Range	Min.	6	0.0005" 0.0127mm	0.0025" 0.0635mm	1.0" 25.4mm
	Max.	18	0.020" 0.50mm	0.160" 4.06mm	10' 3.05M



Single Layer



Dual Layer



Triple Layer