

# Strands and Cables

Strands and cables are ideal for applications requiring more strength and flexibility than a single wire filament. These highly engineered products often utilize complex constructions or processes to enhance fatigue life, strength, flexibility, torque, stiffness and smoothness. Strands are manufactured by wrapping several filaments of wire together to form a single product. If several strands are wrapped together they form a single cable.

## Applications

Fort Wayne Metals manufactures medical grade multi-filament strands and cables in customized configurations for a variety of critical applications. Strands and cables can be offered on spools, discrete lengths and fully assembled. End uses include:

- Orthopaedic Cable Systems
- Orthodontic Appliances
- Spinal Cable Systems
- Endoscopic/Laposcopic Instruments
- Guide Wires
- Bioconductors
- Embolic Protection
- Snares

## Alloy Selection for Cables

All of the raw materials we work with can be transformed into strands or cables. Biocompatibility, strength, fatigue, flexibility, torqueability and radiopacity are just a few items that might be considered during alloy selection. Our engineering staff can assist you in determining the appropriate alloy for your strand or cable application. Here is a small list of medical grade materials that are commonly used for strand and cable systems:

- Ti 6Al-4V ELI
- 316LVM (316LS)
- 35N LT<sup>®</sup>
- MP35N-DFT<sup>®</sup>
- MP35N<sup>®</sup>
- Nitinol (Binary & Ternary)
- L-605 (HAYNES<sup>®</sup> 25)
- 22Cr-13Ni-5Mn
- 304V
- Biodur<sup>®</sup> 108
- CP Ti Gr. 2
- Ti 6Al-7Nb
- FWM 1058<sup>™</sup>

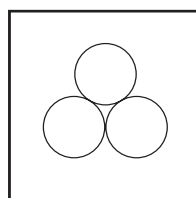
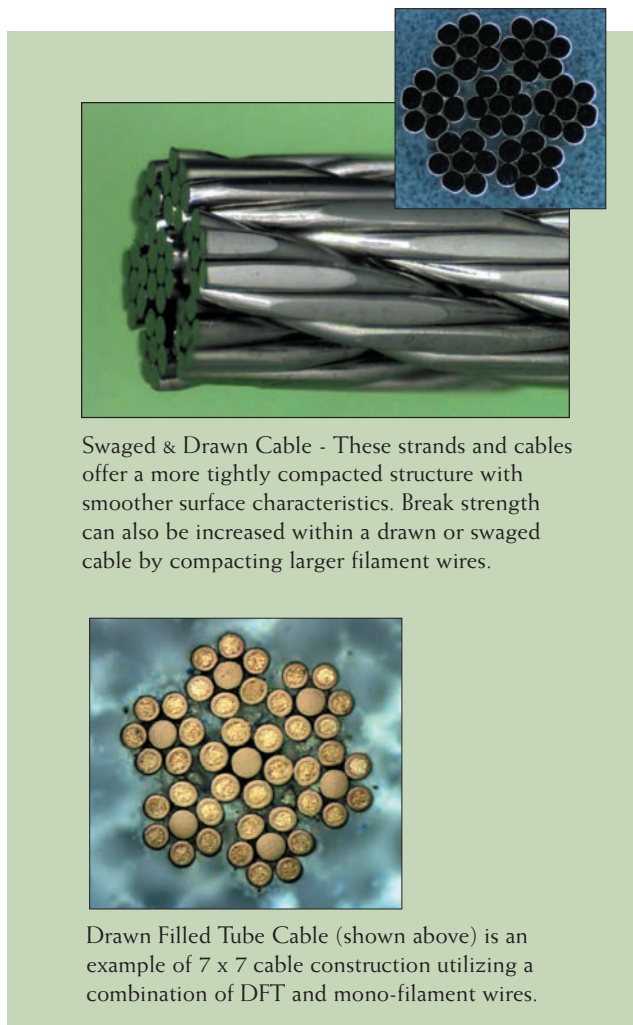
## DFT<sup>®</sup> (Drawn Filled Tube) Strands & Cables

Multi-filament DFT material allows the device maker to match dissimilar materials to provide a variety of unique properties. One of the more common uses of DFT strands and cables is found in the medical device industry where designers have integrated the strength and biocompatibility of implant grade alloys with desired properties of other materials.

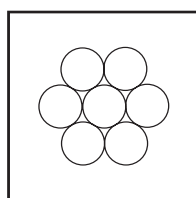
The composite typically uses the outer sheath to impart strength while the core material is designed to provide conductivity, radiopacity, resiliency or MRI enhancement.

## Construction Capabilities

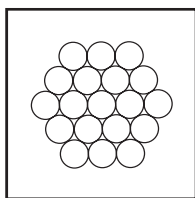
Aside from the typical strand and cables constructions (see illustrations at bottom of this page), we also offer specialty constructions such as swaged, drawn strands and cables with tighter tolerances. We can work with you to create a specialty strand or cable that fits your unique application.



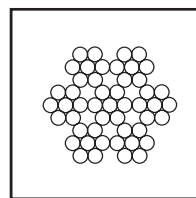
1 x 3 (3 wires)



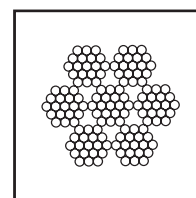
1 x 7 (7 wires)



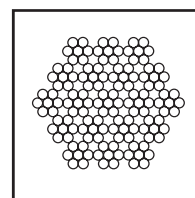
1 x 19 (19 wires)



7 x 7 (49 wires)



7 x 19 (133 wires)



19 x 7 (133 wires)

**Size Availability & Tolerances**

Fort Wayne Metals has the capability to manufacture strands and cables in a variety of sizes and constructions. Ranging from ultra fine or miniature strands with diameters below 0.004" to cables up to 0.125" in diameter. Tolerances can vary depending on diameter, construction, swaging, or drawing, therefore, please contact our technical staff with your requirements.

**Assembly**

Our assembly room allows our customers the option of one stop shopping. Trained experts can perform a variety of value added manufacturing operations to enhance your strand or cable. Services include:

- Beading                      - Welding                      - Grinding
- Fusing                        - Swaging                      - Cutting
- Passivation                - Crimping

**Breakload & Tensile Strength**

Through many years of experience, Fort Wayne Metals has collected and analyzed ultimate tensile strength and breakload (the force required to break the strand or cable under tension) mechanical data from various strand and cable configurations. Understanding both of these mechanical attributes aid in the design of a strand or cable.

**Coatings**

Fort Wayne Metals offers a variety of biocompatible coatings that provide insulation for strands and cables. Common coatings include ethylene tetrafluoroethylene (ETFE), polytetrafluoroethylene (PTFE) and perfluoroalkoxy (PFA).

**Cleaning**

Most strand and cable systems manufactured at Fort Wayne Metals take advantage of our stringent cleaning techniques. Strands and cables have the ability to trap contaminants once the wire filaments have been grouped together. We pride ourselves on removing these contaminants (oil, dirt, dust, etc.) through a variety of cleaning steps, which include isopropyl alcohol wipe, hot alkaline cleaning and ultrasonic cleaning. Our technical staff will be glad to help you determine which cleaning method will work best with your application.

<b>Strand and Cable Size and Capability</b>			
<i>As a general guideline Fort Wayne Metals can strand wires with filament diameters down to 0.001".</i>			
Construction	Finished Diameter	Flexibility	Torque
1 x 3	2.15 x d	Lowest	Greatest
1 x 7	3 x d		
1 x 19	5 x d		
7 x 7	9 x d		
7 x 19	15 x d		
19 x 7	15 x d	Greatest	Lowest

d= diameter of single filament