Jameco Part Number 141874

Properties	Flexinol Name	*025*	*037*	*050*	*075*	*100*	*125*	*150*	*200*	*250*	*300*	*375*
Physical	Wire Diameter (µm)	25	37	50	75	100	125	150	200	250	300	375
	Minimum Ben Radius (mm)	1.3	1.85	2.5	3.75	5.0	6.25	7.5	10.0	12.50	15.0	18.75
	Cross-sectional Area (μm^2)	490	1,075	1,960	4,420	7,850	12,270	17,700	31,420	49,100	70,700	110,450
Electrical	Linear Resistance (Ω/m)	1,770	860	510	200	150	70	50	31	20	13	8
	Recommended Current† (mA)	20	30	50	100	180	250	400	610	1,000	1,750	2,750
	Recommended Power† (W/m)	0.71	0.78	1.28	2.0	4.86	4.4	8.00	12.0	20.0	39.8	60.5
Strength*	Max. Recovery Weight @ 600 MPa (g)	29	65	117	250	469	736	1,056	1,860	2,933	4,240	6,630
	Rec. Recovery Weight @ 190 MPa (g)	7	20	35	80	150	230	330	590	930	1,250	2,000
	Rec. Deformation Weight @ 35 MPa (g)	2	4	8	815	28	43	62	110	172	245	393
Speed	Typical Contraction Speed†† (sec)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	LT Relaxation Speed†† (sec)	0.16	0.25	0.3	0.5	0.8	1.6	2.0	3.5	5.5	8.0	13.0
	LT Alloy Thermal Cycle Rate (cyc/min)	52	48	46	40	33	23	20	13	9	7	4
	HT Relaxation Speed†† (sec)	n.a.	0.09	0.1	0.2	0.4	0.9	1.2	2.2	*3.5*	6	10
	HT Alloy Thermal Cycle Rate (cyc/min)	n.a.	55	55	50	43	32	27	19	*13*	9	5

		LT Alloy	*HT Alloy*
Thermal	Activation Start Temp. (°C)	68	88
	Activation Finish Temp. (°C)	78	98
	Relaxation Start Temp. (°C)	52	72
	Relaxation Finish Temp. (°C)	42	62
	Annealing Temp. (°C)	300	300
	Melting Temp. (°C)	1,300	1,300
	Specific Heat (cal/g°C)	0.077	0.077
	Heat Capacity (Joule/g°C)	0.32	0.32
	Latent Heat (Joule/g)	24.2	24.2
Material	Density (g/cc)	6.45	
	Maximum Recovery Force (MPa)	600	(~43 ton / in^2)
	Recommended Deformation Force (MPa)	35	(~2.5 ton / in^2)
	Breaking Strength (MPa)	1,000	(~71 ton / in^2)
	Poisson's Ratio	0.33	
	Work Output (Joule/g)	1	
	Energy Conversion Efficiency (%)	5	
	Maximum Deformation Ratio (%)	8	
	Recommended Deformation Ratio (%)	3-5	
Phase Related	Phase	*Martensite*	*Austenite*
	Resistivity (µΩcm)	76	82
	Young's Modulus (GPa)	28	75
	Magnetic Susceptibility (µemu/g)	2.5	3.8
	Thermal Conductivity (W/cm°C)	0.08	0.18

† *In still air, at* 20°C.

* *To obtain force in Newtons, multiply mass in grams by 0.0098.*

†† *Depends greatly on local heating and cooling conditions. See text.*

Figure 2.8 Flexinol Muscle Wire Properties
This table shows values for various sizes of Flexinol Muscle Wires that have a transition temperature of 70°C.

Poisson's Ratio *— Describes how much a material narrows when pulled at each end (i.e. the cross-sectional shrinkage in a material under strain). For nitinol it is about 0.33 (the same as aluminum). Like Young's Modulus, this ratio varies widely, and depends greatly on the alloy's composition, training and temperature.*

Magnetic Fields & Susceptibility *Nitinol is virtually non magnetic. Also a straight wire carrying a current generates a much smaller magnetic field than does a coil of wire (as in motors and solenoids).*

Electrical Properties

Voltage, current, and resistance of a Muscle Wire follow the basic equation of electricity, Ohm's Law:

$$V = i \times R$$

voltage (in volts) equals current (in amps) times resistance (in ohms)

So if you know a wire's resistance (which varies directly with its length) and the recommended current level to activate it, you can calculate the required voltage by using Ohm's Law. For example, a 10 cm