JACQUES ALLEMANN
NOTZ group advanced metal solutions

Nitinol

Description	NiTi	EN standard	AFNOR	ASTM	DIN
		-	-	F2063	-

Chemical composition

Ni	Ti	C	Co	Cu	Cr	M	Fe
55	45	0.05 max	0.05 max	0.01 max.	0.01 max	0.05 max	0.02 max

Chemical analysis according to European EN standard in percentages by mass. / *Other

Main technical properties and features

Nitinol is a biocompatible shape memory nickel-titanium (~1:1) alloy with unique super-elastic properties. This essential alloy for medical engineering acquires its exceptional properties through a phase transformation from martensite to reversible austenite. It can withstand reversible deformations of up to 8% thanks to super-elasticity – a performance far superior to conventional steels or titanium. Very thorough control of the manufacturing processes makes it possible to confer these properties on Nitinol and adjust its parameters. The material also exhibits excellent fatigue strength, in particular due to its mode of deformation by phase transformation rather than conventional plasticisation. We apply standards ASTM F2063 and F2516 for the specifications and testing methods of Nitinol alloys.

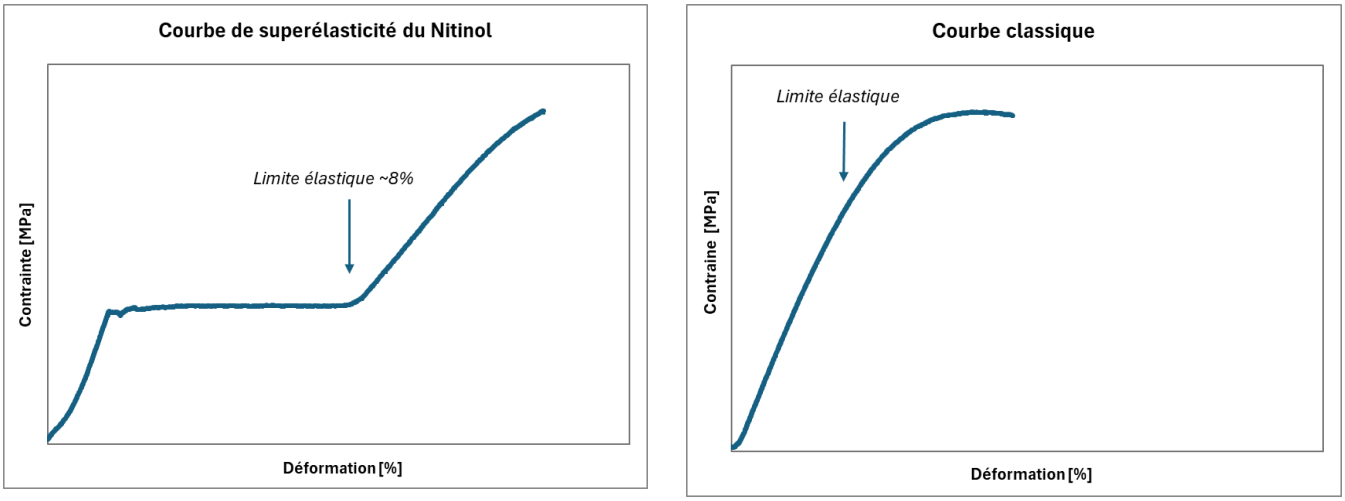

Figure: Elasticity of Nitinol in the tempered state (left) and cold worked (right).

Dimensions

Products	Ø [mm]	Dimension (mm)	Length (mm)
Wires and bars	0.020 - 2.000		4500 max
Flat and profile wires		0.01 min x 10,000 max	

Technical data

Typical applications:

- Auto-expandable stents
- Guidewires
- Orthodontics
- Vein filters, implants
- Surgical instruments, baskets
- Mini actuators

Mechanical characteristics

Superplasticity and shape memory properties can be determined by adjusting production parameters. Achieving the desired properties depends closely on our expertise, as Nitinol reacts very sensitively to manufacturing conditions. A specific production approach is therefore essential to guarantee the expected characteristics.

The delivery states are annealed soft, cold worked or tempered (and thus may or may not give superelastic properties)

Physical properties

Density		6.5	g/cm^3
Melting point		1310	°C
Young's modulus – austenite Young's modulus – martensite		75 - 80 28 - 40	GPa
Resistivity – austenite Resistivity – martensite	20 ºC	82 76	×10^{-8} Ω·m
Thermal conductivity – austenite Thermal conductivity – martensite	20 °C	18 9	W/m·K
Coefficient of thermal expansion – austenite Coefficient of thermal expansion – martensite	20 ºC	11 6.6	×10^{-6} /°C

Note

All information provided in this data sheet is based on the best knowledge and state of the art, but without warranty. The use of materials should always be discussed with our sales specialists or our materials laboratory on a product- and application-specific basis.

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