

# Mechanical Alloys

When selecting wire for mechanical applications there are four classifications from which to choose a specific material or alloy. They are: nickel base lockwires, carbon steels, stainless steels and superalloys. A three-part evaluation procedure is recommended: 1) initial screening based on temperature and corrosion requirements; 2) analysis of physical properties; and 3) final screening on the basis of specific properties, material, and forming costs.

MATERIAL	COMPOSITION (%)	RESISTIVITY	COEFFICIENT OF LINEAR EXPANSION (0-100°C)	TENSILE STRENGTH NOMINAL (KPSI)		DENSITY	MAGNETIC ATTRACTION	MELTING POINT
				SOFT	HARD			
		OHMS/CMF	µm/m			lb/in³		(°C)
#302 Stainless Steel	Cr 18, Ni 9, Mn 2, Si 1, C .12, N .1, P .045, S .03, Bal Fe	433.1	17.3	125	330	0.290	None	1,410
#304 Stainless Steel	Cr 19, Ni 9.25, Mn 2, Si 1, C .08, N .1, P .045, S .03, Bal Fe	433.1	17.3	125	330	0.290	None	1,425
#316 Stainless Steel	Cr 17.25, Ni 12, Mo 2.25, Mn 2, Si 1, C .07, N 0.1, P .045, S .03, Bal Fe	444.6	15.9	113	260	0.290	None	1,387
#321 Stainless Steel	Cr 18, Ni 10.5, Mn 2, Si 1, Ti .4, C .08, P .045, S .03, Bal Fe	433.1	16.6	130	250	0.290	None	1,387
Inconel* 600	Ni 72, Cr 15.5, Fe 8, Mn 1, Cu .5, Si .5, C .15, S .015	619.6	11.8	110	205	0.306	None	1,384
Inconel* X-750	Ni 70, Cr 15.5, Fe 7, Ti 2.5, Mn 1, Nb .75, Al 0.7, Si .5, Cu .5, C .08, S .01	733.9	12.0	145	225	0.299	None	1,410
Monel* 400	Ni 63-70, Cu 28-34, Fe 2.5, Mn 2, Si .5, C .3, S .024	329.0	13.5	83	163	0.318	Weak	1,325
Niobium	Ta .20, W .05, O .025, Hf .02, C .01, N .01, Al .005, Balance Nb	91.43	7.0	125	240	0.310	Strong	2,477
Tungsten	W 99.95 min, Thorium balance	33.08	4.3	175	500	0.697	Weak	3,410

\*Registered trademark of Inco family of companies

## Mechanical Alloys Stress-Strain Relation Curve

