

Free-Cutting Stainless Steel

ASADA CORPORATION

<http://www.asada-metal.com/>

Asada Corporation is a specialized trading company
for wires and strips such as steels, wires, piano wires,
hard drawn steel wires, stainless steel wires etc.

NAS FREE-CUTTING WIRES 5

It is a well-known fact that, in general, the machining of stainless steel is very difficult compared with other types of steel. This is particularly true with the austenite stainless steel containing nickel and chromium, which is due to its poor processability.

Therefore, stainless-steel free-cutting wire must offer good processability yet retain high resistance to corrosion (the essential property desired in stainless steel). To fulfill these paradoxical characteristics, NAS wires are manufactured with special consideration for factors such as chemical composition, mechanical properties, etc.

Furthermore, as part of our environmental protection program we have committed our resources to the development of a new, highly anticorrosive super-free-cutting ferrite stainless steel that does not contain harmful lead elements.



Types of Steel

Types of Steel	Chemical Composition %									Corresponding
NAS	C	Si	Mn	P	S	Ni	Cr	Mo	Other	JIS SUS
303	0.15Max.	1.00Max.	2.00Max.	0.20Max.	0.15Min.	8.00~10.00	17.00~19.00	0.60Max.	—	303
303Cu	0.08Max.	1.00Max.	2.50Max.	0.20Max.	0.25Min.	8.00~10.00	17.00~19.00	0.60Max.	Cu2.50~4.00	303Cu
303Se	0.15Max.	1.00Max.	2.00Max.	0.20Max.	0.060Max.	8.00~10.00	17.00~19.00	—	Se0.15Min.	303Se
303N	0.15Max.	1.00Max.	2.00Max.	0.20Max.	0.15Min.	8.00~10.00	17.00~19.00	—	N,Nb addition	—
303FM	0.15Max.	1.00Max.	2.00Max.	0.20Max.	0.15Min.	8.00~10.00	17.00~19.00	—	Pb addition	—
316F	0.08Max.	1.00Max.	2.00Max.	0.045Max.	0.10Min.	10.00~14.00	16.00~18.00	2.00~3.00	—	316F
316FM2	0.08Max.	1.00Max.	2.00Max.	0.045Max.	0.10Min.	9.00~10.00	17.00~19.00	0.50~1.00	Cu2.00~3.00 Se0.10Min.	—
416	0.15Max.	1.00Max.	1.25Max.	0.060Max.	0.15Min.	—	12.00~14.00	—	—	416
410F2	0.15Max.	1.00Max.	1.00Max.	0.045Max.	0.030Max.	—	11.50~13.50	—	Pb0.07~0.30	410F2
416FM	0.15Max.	1.00Max.	1.25Max.	0.060Max.	0.10~0.20	0.60Max.	12.00~14.00	0.10~0.30	Pb0.10~0.30 Se0.10~0.20	—
420F	0.26~0.40	1.00Max.	1.25Max.	0.060Max.	0.15Min.	—	12.00~14.00	—	—	420F
420F2	0.26~0.40	1.00Max.	1.00Max.	0.045Max.	0.030Max.	—	12.00~14.00	—	Pb0.07~0.30	420F2
430F	0.12Max.	1.00Max.	1.25Max.	0.060Max.	0.15Min.	—	16.00~18.00	—	—	430F
430F2	0.03Max.	1.00Max.	2.00Max.	0.05Max.	0.25Min.	—	19.00~21.00	1.50~2.50	Te,B : addition	—

Tensile Strength of NAS Free-Cutting Wires

Wire Diameter mm	NAS303, NAS303Cu, NAS303Se, NAS316F, NAS316FM2				NAS416, NAS420F, NAS430F NAS410F2, NAS416FM, NAS420F2	
	Hard Finish	Soft Skin-Pass Finish	1/8 Hard Finish	1/4 Hard Finish	1/8 Hard Finish	1/4 Hard Finish
1.00~1.60	590~830	640~880	780~1030	880~1130	640~880	690~930
1.61~5.00	540~780	590~830	740~980	830~1080	590~830	640~880
5.01~14.0	490~740	540~780	740~930	780~1030	590~780	640~830

Properties

When selecting a stainless-steel free-cutting wire, an optimal type suitable for application must be selected with careful consideration for properties such as strength and corrosion resistance.

● NAS303, NAS416, NAS420F, NAS430F, NAS316F, NAS416FM

Sulfur is added at approximately 0.15%-0.35% to improve processability.

● NAS303Se, NAS416FM

Selenium is added by about 0.2% to improve processability.

● NAS303Cu, NAS316FM2

Free-cutting compound steel containing sulfur and copper; offers superior processability and enhanced corrosion resistance.

● NAS410F2, NAS420F2, NAS416FM

Lead is added to about 0.15% for improved processability.

Types of steel	Properties	Magnetism	Quenching hardenability
NAS303 (SUS303)		Nonmagnetism	—
NAS303Cu (SUS303Cu)		Nonmagnetism	—
NAS303Se (SUS303Se)		Nonmagnetism	—
NAS303N		Nonmagnetism	—
NAS303FM		Nonmagnetism	—
NAS316F (SUS316F)		Nonmagnetism	—
NAS316FM2		Nonmagnetism	—
NAS430F (SUS430F)		Ferromagnetic	—
NAS416 (SUS416)		Ferromagnetic	○
NAS410F2 (SUS410F2)		Ferromagnetic	○
NAS416FM		Ferromagnetic	○
NAS420F (SUS420F)		Ferromagnetic	○
NAS420F2 (SUS420F2)		Ferromagnetic	○