

Natoli Quality Steel & Coatings Chart

Natoli Steel Specification Chart																		
Steel Type	Steel Grade	Tooling Type		Hardness Rockwell C	Nominal Chemical Composition (%)										Benefits			
		Punch	Die		C	Cr	Mn	Mo	Ni	P	S	Si	V	W	WR	IT	CR	CS
408	Standard	•	–	53-55	0.50%	0.75%	0.50%	–	3.00%	0.04%	–	0.30%	–	–	–	•	–	•
S-1	Standard	•	–	56-58	0.50%	1.40%	0.25%	0.25%	0.15%	0.03%	0.03%	0.70%	0.20%	2.25%	–	•	–	•
S-7	Standard	•	•	56-58	0.50%	3.25%	0.55%	1.50%	–	0.03%	0.03%	0.60%	0.2-3%	–	–	•	–	•
D-2	Premium	•	•	58-60	1.50%	12.00%	0.30%	0.95%	0.15%	0.03%	0.03%	0.30%	1.00%	–	•	•	•	–
DC-53	Premium	•	•	59-61	1.00%	8.00%	–	2.00%	–	–	–	–	0.25%	–	•	•	•	•
K-340	Premium	•	•	58-60	1.10%	8.20%	0.40%	2.10%	–	–	–	0.70%	0.50%	–	•	•	–	•
D-3	Premium	–	•	59-61	2.20%	12.25%	0.30%	–	–	0.03%	0.03%	0.30%	0.50%	0.50%	•	•	–	•
440C	Premium	•	•	54-56	1.10%	17.00%	0.75%	0.40%	–	–	–	0.50%	–	–	–	–	•	–
M-340	Premium	•	–	56-58	0.54%	17.30%	0.40%	1.10%	–	–	–	0.45%	0.10%	–	•	–	•	–
A-2	Premium	•	•	58-60	1.00%	5.10%	0.50%	1.15%	0.15%	0.03%	0.03%	0.25%	0.35%	–	–	•	–	–
M-2	Premium	•	•	58-60	0.80%	4.10%	0.25%	5.00%	0.15%	0.03%	0.03%	0.30%	2.00%	6.20%	–	•	–	–
PM-15V	Powdered Metal	–	•	58-60	3.40%	5.25%	0.50%	1.30%	–	–	–	0.90%	14.50%	–	•	•	–	–
PM-9V	Powdered Metal	•	•	53-55	1.90%	5.25%	0.50%	1.30%	–	–	–	0.90%	9.10%	–	•	•	–	–
PM-3V	Powdered Metal	•	•	56-58	0.80%	7.50%	0.30%	1.30%	–	–	–	1.00%	2.75%	–	•	•	–	•
PM-10V	Powdered Metal	•	•	58-60	2.45%	5.25%	0.50%	1.30%	–	–	–	0.90%	9.75%	–	•	•	–	–
PM-M2	Powdered Metal	•	–	58-60	0.80%	4.10%	0.25%	5.00%	0.15%	0.03%	0.03%	0.30%	2.00%	6.20%	•	•	–	–
PM-M4	Powdered Metal	•	•	58-60	1.42%	4.00%	0.30%	5.25%	0.15%	0.03%	0.03%	0.30%	4.00%	5.50%	•	•	–	–
PMS-90V	Powdered Metal	•	–	56-58	2.30%	14.00%	–	1.00%	–	–	–	–	9.00%	–	•	–	•	•
Hastelloy	Powdered Metal	•	–	–	0.01%	22.00%	0.50%	13.00%	56.00%	–	–	0.08%	0.35%	3.00%	–	–	•	–
Carbide Dies	Specialty	–	•	–	–	–	–	–	–	–	–	–	–	–	•	–	–	–
Carbide Tip Punches	Specialty	•	–	–	–	–	–	–	–	–	–	–	–	–	•	–	–	–
Ceremic Dies	Specialty	–	•	–	–	–	–	–	–	–	–	–	–	–	•	–	•	–
Sleipner	Die Segment Plate	–	–	61-63	0.90%	7.80%	0.50%	2.50%	–	–	–	0.90%	0.50%	–	•	•	–	•
M-390	Die Segment Plate	–	–	58-60	1.90%	20.00%	0.30%	1.00%	–	–	–	0.70%	4.00%	0.60%	•	–	•	–

The ASTM E45 International Steel Testing Procedure is the test method used to determine the quality and cleanliness of tool steel. **Natoli Engineering's value is less than 1.5.**

Natoli Coating Specification Chart																		
Coating	Characteristics			Tooling Type		T. Pins	E. Seg	Allowable Steel Grades					RF	RS	Benefits			
	Hardness	Thickness	Color	Punch	Die			S	SS	P	PM	SPC			WR	CR	ESL	
Natoli Cr 50	950 HV	3-6 microns	Silver	•	–	•	–	•	•	•	•	•	•	•	–	•	•	
Natoli Ultracoat HC 100 (Hard Chrome)	1200 HV	4-8 microns	Silver	•	–	•	–	•	•	•	•	•	•	•	•	•	•	
Natoli UltraCoat HC 150+ (PVD Hard Chrome)	2200 HV	3-4 microns	Silver	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Natoli UltraCoat CrN 200 (Chromium Nitride)	2400 HV	3-4 microns	Silver	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Natoli UltraCoat TiN 300 (Titanium Nitride)	2800 HV	3-4 microns	Metallic Gold	•	•	•	•	•	•	•	•	•	•	–	•	•	–	
Natoli UltraCoat ZrN 400 (Zirconium Nitride)	2500 HV	2-4 microns	Light Gold	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Natoli UltraCoat DLC 500 (Diamond Like Carbon)	2800 HV	3-4 microns	Black	•	•	•	•	•	•	•	•	•	•	–	•	•	•	
Nickel/Fluoropolymer 202P	900 HV	20 microns	Gold	•	–	–	–	•	–	•	•	•	•	•	–	•	•	
Plasma Nitriding	1000 HV	75-100 um case	Black	•	•	–	–	–	–	•	–	•	–	–	•	•	•	

Element Symbols

C = Carbon
Cr = Chromium
Mn = Maganese
Mo = Molybdenum
Ni = Nickel
P = Phosphorous
S = Sulfur
Si = Silicon
Ti = Titanium
V = Vanadium
W = Tungsten

Benefit Codes

WR = Wear Resistant
IT = Improved Toughness
CR = Corrosion Resistant
CS = Compressive Strength
RF = Reduced Friction
RS = Reduced Sticking

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