

# Nickel-based Powders

Grade	HRC	Chemical Composition %											Applications
		C	Cr	Si	Fe	Mo	Co	Mn	B	Cu	Others	Ni	
Ni15AA	15	0.03	0.46	2.30	≤0.50			0.09	0.90	20.0		Bal	Base coat for WC powder
Ni20M	20	0.03	4.50	2.00					0.70			Bal	Glass mould, etc.
Ni20PTA	20	0.05	1.00		≤0.15				0.90			Bal	Glass mould, etc.
Ni22AA	22	0.20	0.10	2.85	≤0.50			0.50	1.45			Bal	Glass mould, etc.
Ni22APTA	28	≤0.05	4.50	3.80	≤3.00			0.30	1.00			Bal	Glass mould, etc.
Ni22M1	26	0.03	0.50	3.00	≤0.50			0.50	1.00		≤5.00	Bal	Glass mould, etc.
Ni25	25	0.20		3.50	≤8.00				1.50			Bal	Glass mould, etc.
Ni28M	28	0.05	0.10	2.80					1.00			Bal	Glass mould, etc.
Ni30AA	30	0.15	2.50	2.60	≤1.00			0.30	1.40			Bal	Pulley, Gear
NJ30-HY	30	0.03	4.00	2.40	≤0.50				1.00			Bal	Glass mould, etc.
NJ30-PTA	30	0.40	5.50	4.00	≤1.50				1.00			Bal	Glass mould, etc.
Ni31M	31	≤0.05	4.00	2.40	≤3.00				0.90		≤5.00	Bal	Glass mould, etc.
Ni31M1	32	≤0.05	3.50	3.20	≤3.00			0.30	0.90		≤5.00	Bal	Glass mould, etc.
Ni35AA	35	0.20	8.00	3.20	≤3.00	0.10		0.10	1.60			Bal	Glass mould, Valve seat

Typical particle sizes: -100/+270 mesh

-150/+325 mesh

-270/+500 mesh

-325/+800 mesh

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		C	Cr	Si	Fe	Mo	Co	Mn	B	Cu	Others	Ni	
Ni35	35	0.30	10.5	3.50	≤10.0				2.00			Bal	Glass mould, etc.
Ni36M	36	≤0.05	4.00	2.50	≤3.00			≤0.50	1.10		≤5.00	Bal	Glass mould, etc.
Ni40AA	40	0.30	7.50	3.50	≤2.30	0.10		0.10	1.70			Bal	Screw feeder, Mould core
Ni45A	45	0.05	8.00	3.50	≤10.0				2.00			Bal	Screw feeder, Mould core
Ni45PTA	46	0.05	7.50	3.80	≤5.00				2.00			Bal	Punch, Valve, Plunger
Ni46M	46	0.05	6.54	2.80	≤1.00			0.35	1.00		≤5.00	Bal	Glass mould, etc.
Ni50AA	50	0.45	11.0	4.00	≤5.00			0.30	2.20			Bal	Punch, Valve, Plunger
Ni50CuMoW	51	0.30	11.0	4.00	≤5.00	1.00			3.00	0.50	W:1.50	Bal	Punch, Valve, Plunger
Ni55A	55	0.50	15.0	4.00	≤8.00				3.00			Bal	Abrasives, Cam, Plunger, Exhaust Valve
Ni55CuMo	53	0.40	15.0	4.30	≤12.0	2.50			3.10	2.50		Bal	Abrasives, Cam, Plunger, Exhaust Valve
Ni55AAPT	58	0.80	15.0	4.00	≤5.00			≤0.20	3.00			Bal	Abrasives, Cam, Plunger, Exhaust Valve
Ni56AA	56	0.60	13.5	3.80	≤5.00			≤0.50	2.60			Bal	Valve, Mould, Screw
Ni58A	58	0.60	14.0	4.20	≤10.0	1.70			3.40	1.80		Bal	Plunger, Valve, Pump blade, Screw
Ni58AMo	58	0.50	15.0	4.00	≤10.0	2.00			3.50	1.50		Bal	Plunger, Valve, Pump blade, Screw

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# Nickel-based Powders

Grade	HRC	Chemical Composition %											Application	
		C	Cr	Si	Fe	Mo	Co	Mn	B	Cu	Others	Ni		
Ni60AA	60	0.78	15.9	4.55	≤5.00					3.00			Bal	Plunger, Valve, Pump blade, Screw
Ni60A	60	0.70	15.0	4.00	≤8.00			≤0.10	3.20				Bal	Plunger, Valve, Pump blade, Screw
Ni60PTA	60	1.10	19.0	5.50	≤5.00				2.80				Bal	Plunger, Valve, Pump blade, Screw
Ni60GM	60	1.00	14.0	3.50	≤15.0	0.80			3.00				Bal	Plunger, Valve, Pump blade, Screw
ND500	52	1.20	20.5	2.90	≤3.00	5.50	13.0		2.30				Bal	Extruder, Screw PTA
NF600W	60	0.70	15.0	2.50	≤5.00				3.00		W:4.30		Bal	Extruder, Screw PTA

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# Cobalt-based Powders

Grade	HRC	Chemical Composition %										Applications
		C	Cr	Si	Mo	Fe	Mn	W	Ni	Others	Co	
Co01	48-54	2.40	30.0	1.00	≤1.00	≤3.00	≤1.00	12.0	≤3.00		Bal	Valve seat, Bearing, Rotary sealing ring, etc.
Co02	45-50	1.00	28.0	1.20	≤1.00	≤3.00	≤1.00	5.00	≤3.00		Bal	Valve seat, Bearing, Rotary sealing ring, etc.
Co03	48-54	2.30	30.0	1.00		≤3.00		12.0	≤3.00		Bal	Valve seat, Guide roller, etc.
Co06	38-44	1.20	30.0	1.00	≤1.00	≤3.00	≤1.00	4.50	≤3.00		Bal	Engine valve, High pressure valve, etc.
Co06H	43-48	1.30	30.0	1.50	0.80	≤3.00	1.00	5.50	≤3.00		Bal	Engine valve, High pressure valve, etc.
Co12	42-48	1.40	29.0	1.40	≤1.00	≤3.00	≤1.00	8.50	≤3.00		Bal	Saw tooth, Screw push rod, etc.
Co12B	45-49	1.30	30.0	1.00	5.00	≤3.00	≤1.00	5.50	10.5		Bal	Saw blade guide, etc.
Co12H	48-53	1.70	30.0	1.70	2.00	≤2.00	≤0.50	7.00	≤3.00		Bal	Valve, Saw tooth, Screw, etc.
Co19	48-56	1.80	31.0	1.00		≤3.00	1.00	11.0	≤3.00		Bal	Cutter, etc.
CoF	37-44	1.60	26.0	1.10	≤0.50	≤3.00	≤0.50	12.0	22.5		Bal	Engine valve, etc.
Co20	57-63	2.50	32.0	1.00	≤1.00	≤3.00	≤1.00	18.0	≤3.00		Bal	Bearing sleeve, Wear plate, etc.
CoX-40	30-35	0.80	25.5	0.40	≤1.00	≤1.00	≤0.50	7.50	10.5		Bal	Hot gas erosion resistant steam turbine parts
Co25	Max.20	≤0.10	20.0	0.80	≤0.80	≤3.00	≤1.30	15.0	10.0		Bal	Hot extrusion die, etc.
Co306	34-40	0.40	25.0	1.00		≤4.00	1.00	2.50	6.00	Nb:7.00	Bal	Hot scissors, Clamp head, Guide wheel, etc.
Co190	57-63	3.30	26.0	0.80	≤1.00	≤3.00	≤1.00	14.0	≤3.00		Bal	Oil drilling bit, etc.

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		C	Cr	Si	Mo	Fe	Mn	W	Ni	Others	Co	
Co21	28	0.25	27.5	2.00	5.50	2.00	≤1.00	0.15	2.50		Bal	Various fluid valves, Valve seat, etc.
Co6113	43-48	1.80	27.0		4.00				6.00	Nb:5.00	Bal	Corrosion and wear conditions
Co400	48-54	≤0.08	8.50	2.50	29.0	≤2.00	≤0.50		≤1.00		Bal	Galvanized spool sleeve and bushing
Co400M1	51-57	≤0.08	14.0	2.60	26.0	≤0.50	≤0.50		0.50		Bal	Galvanized spool sleeve and bushing
Co400M2	46-52	0.08	17.0	1.20	22.0	≤0.50	≤0.50		0.50		Bal	High temperature corrosion resistant condition
Co401	46-52	≤0.08	17.0	1.20	22.0	≤0.50	≤0.50		≤0.50		Bal	Galvanized spool sleeve and bushing
Co800	52-58	≤0.08	17.5	3.50	29.0	≤2.00	≤0.50		≤1.00		Bal	Galvanized spool sleeve and bushing
Co701	50-56	2.50	31.0	0.50	13.0	≤3.00	0.50		≤3.00		Bal	Valve, Sealing ring, etc.
Co702	45-50	1.80	29.0	0.50	9.00	≤3.00	0.50		≤3.00		Bal	High temperature corrosion resistant valve
Co706	38-43	1.20	29.0	0.50	5.00	≤3.00	1.00		≤3.00		Bal	High temperature corrosion resistant valve
Co706K	40-46	1.60	31.0	0.50	5.50	≤2.00	1.00		2.00		Bal	High temperature corrosion resistant valve
Co712	45-50	1.80	29.0	0.50	9.00	≤3.00	0.50		3.00		Bal	High temperature corrosion resistant valve
Co720	54-60	2.50	33.0	0.50	18.0	≤3.00	0.80		3.00		Bal	High temperature corrosion resistant valve
Co721	18-24	≤0.05	30.0	0.60	4.00	≤8.00	0.70		≤0.30		Bal	Cavitation resistant parts of steam turbine

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# Iron-based Powders

Grade	HRC	Chemical Composition %								Applications
		C	Cr	Si	Mo	Mn	Ni	Others	Fe	
Fe304		≤0.03	18.0	1.00		≤2.00	10.0		Bal	Medical appliances, Chemistry, Ship parts, etc.
Fe316L		≤0.03	17.0	≤1.00	2.50	≤2.00	12.0	Cu:0.20	Bal	Valve body, Valve seat, Valve stem, Ship parts, etc.
Fe17-4PH	36-40	0.07	16.0	≤1.00		≤1.00	4.00	Nb:0.30	Bal	Paper industry
Fe410L	40-45	0.03	12.5	0.50		≤1.00			Bal	Valve, etc.
Fe420	50-53	0.20	13.0	≤1.00		≤1.00	≤0.75		Bal	Piston, etc.
Fe430	45-48	≤0.12	18.0	≤0.75		≤1.00	≤0.60		Bal	Piston, etc.
Fe431	48-52	0.20	16.0	≤1.00		≤1.00	2.00		Bal	Paper machine
Fe90	52-55	0.15	13.5	≤1.30	<1.00	<1.00	<0.50	≤5.00	Bal	Petroleum drill rod and roller
Fe90-2	60-64	0.30	14.0	≤1.30	<1.00	<1.00	<0.50	≤5.00	Bal	Petroleum drill rod and roller
Fe313	50-54	0.15	16.0	1.00			≤1.00	≤5.00	Bal	Piston, etc.
Fe314	32-35	0.15	18.0	1.00		≤2.00	10.0	≤5.00	Bal	Piston, etc.
Fe1	35-40	≤0.15	22.0	4.50	3.00		13.0	≤5.00	Bal	High temperature resistant roll, Valve, etc.
Fe2	38-44	≤0.15	22.0	4.50	2.00		10.0	≤5.00	Bal	High temperature resistant roll, Valve, etc.
Fe3	56-60	0.80	18.0	4.00			7.00	≤5.00	Bal	Oil drilling rig, Agricultural machinery, Pitch gear, etc.
Fe4	55-60	3.20	33.0	2.00			2.00	≤5.00	Bal	Oil drilling rig, Agricultural machinery, Pitch gear, etc.

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Grade	HRC	Chemical Composition %								Applications
		C	Cr	Si	Mo	Mn	Ni	Others	Fe	
Fe5	62-67	4.50	38.0	1.50		≤0.50	1.00	≤5.00	Bal	Oil drilling rig, Agricultural machinery, Pitch gear, etc.
Fe5A	60-65	4.00	38.0	1.50	≤1.00	≤0.50		≤5.00	Bal	Oil drilling rig, Agricultural machinery, Pitch gear, etc.
Fe5-07	54-58	1.00	16.0	3.00			7.00	≤5.00	Bal	Oil drilling rig, Agricultural machinery, Pitch gear, etc.
Fe5-14	60-64	3.00	30.0	2.00	3.00	≤0.50	5.00	≤5.00	Bal	Oil drilling rig, Agricultural machinery, Pitch gear, etc.
Fe5-14A	60-65	3.50	32.0	3.00	2.50		4.00	≤5.00	Bal	Oil drilling rig, Agricultural machinery, Pitch gear, etc.
Fe5-CD	60-64	4.50	25.0	2.00	3.00	1.50	1.00	V:2.00 Others ≤5.00	Bal	Oil drilling rig, Agricultural machinery, Pitch gear, etc.
Fe6	58-60	0.80	7.50	2.00			32.0	≤5.00	Bal	Metallurgical roll
DFe38A	38-42	1.75	28.0	1.50	4.50		16.0		Bal	Automotive valves
DFe38H	40-44	2.10	28.0	1.50	5.50		11.5		Bal	Automotive valves
Fe45	40-46	0.60	7.50	2.00			22.0	≤5.00	Bal	Paper machinery, Agricultural machinery
D507Mo	23-27	0.15	15.0	1.00	3.00		1.00	≤5.00	Bal	Valve overlaying
D547Mo	40-45	0.15	20.0	2.50	3.50		12.0	≤5.00	Bal	Valve overlaying
Duplex SS	20-24	0.03	25.0	0.80	4.00	1.20	7.00	Cu:0.50 N:0.30	Bal	Paper industry, Petroleum, Chemical industry, etc.

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