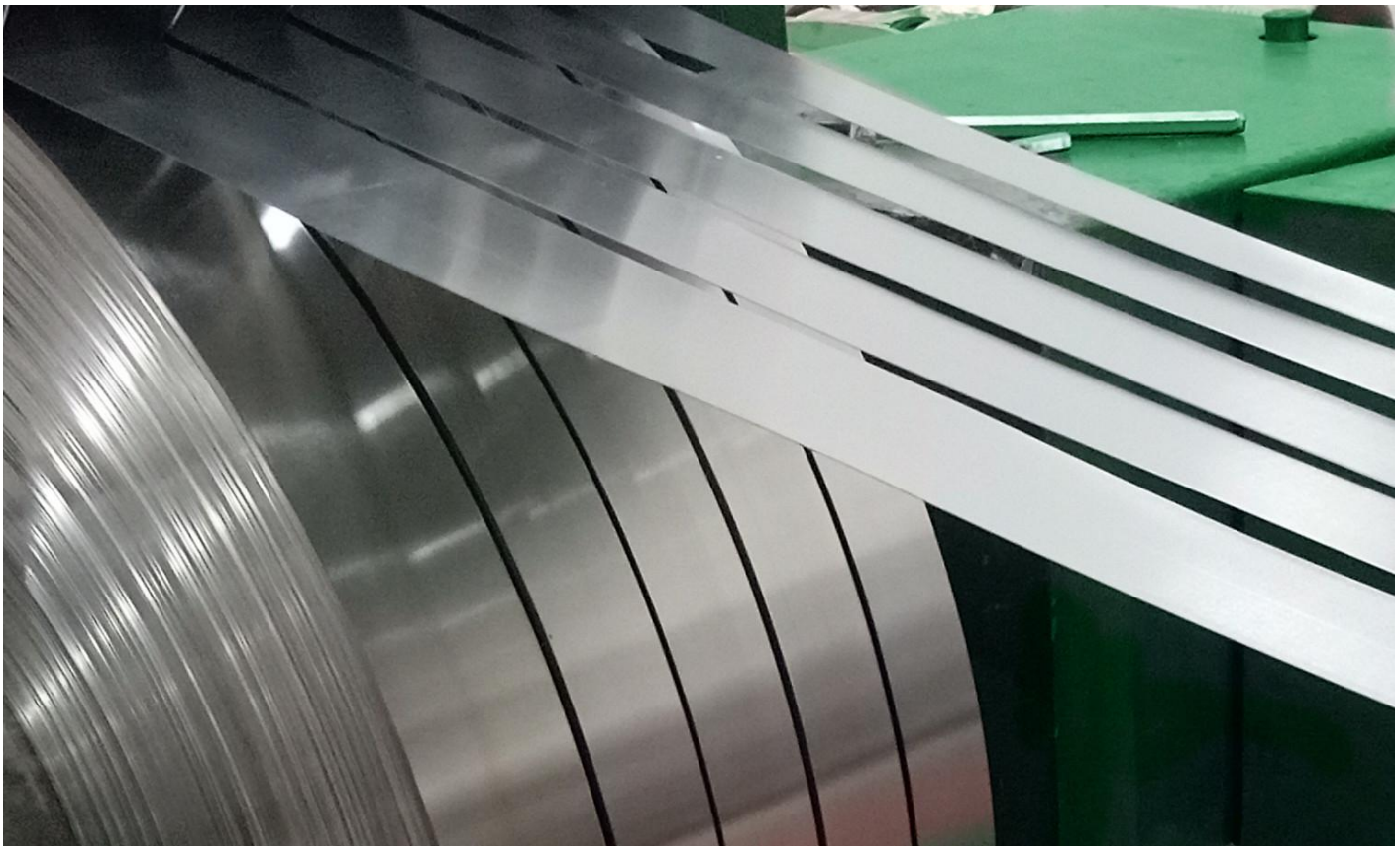
XAGY®

XI'AN GANGYAN SPECIAL ALLOY CO.,LTD.

Soft Magnetic-Iron Cobalt Alloy

Hiperco 50



INTRODUCTION

XI'AN GANGYAN SPECIAL ALLOY CORPORATION (XAGY), our factory specialized in manufacturing Nickel alloys & Cobalt alloys for 25^{+} years， with a company mission to provide a high quality, reliable source for precision alloys, high temperature alloys and stainless steels in both pilot processing and mass production. We are professionally manufacturing materials with unique features, which are then used in aerospace, military, electronics, marine, petroleum and petrochemical industries. Now our company has formally marketed in China's new stock market, stock No. 836660.

Base on "Quality-oriented, Leading Technology, Continuous Improvement, Customer Satisfaction", we believe XAGY Inc can be your best supplier.

Table 1 Composition and executive standard

Material	**Composition % by weight(**Nominal Composition)			**ASTM A 801**
Hiperco 50	Co 49	V 2	Fe 49	Alloy Type 1

Equivalent to MIL A 47182, DIN EN 60404-8-6,MIL-S-1907, MIL-S-1949A

®Registered trademark of **XAGY**

key feature

Highest Saturation magnetic induction

Higher curie temperature

High magnetic flux densities

High magnetostrictive coefficient

C. maximum permeability

low D.C. coercive force and low A.C. core loss

Table 2 Physical Properties	**Alloy type 1** **UNS R30005**
Density,g/cm^3	8.12
Electrical resistivity,μΩm	0.40
Curie Temperature,℃	940
Saturation magnetostriction,10^{-10}	60
Saturation induction,(T)	2.38
Modulus of elasticity,psi	30x10^6
Temperature Range,℃	**Thermal Expansivity,10^{-6}/℃**
20 to 100	9.2
20 to 200	9.5
20 to 300	9.8
20 to 400	10.1
20 to 500	10.4
20 to 600	10.5
20 to 700	10.8
20 to 800	11.3

TABLE 3 DC MAGNETIC PROPERTY

Alloy Type 1 (UNS R30005)

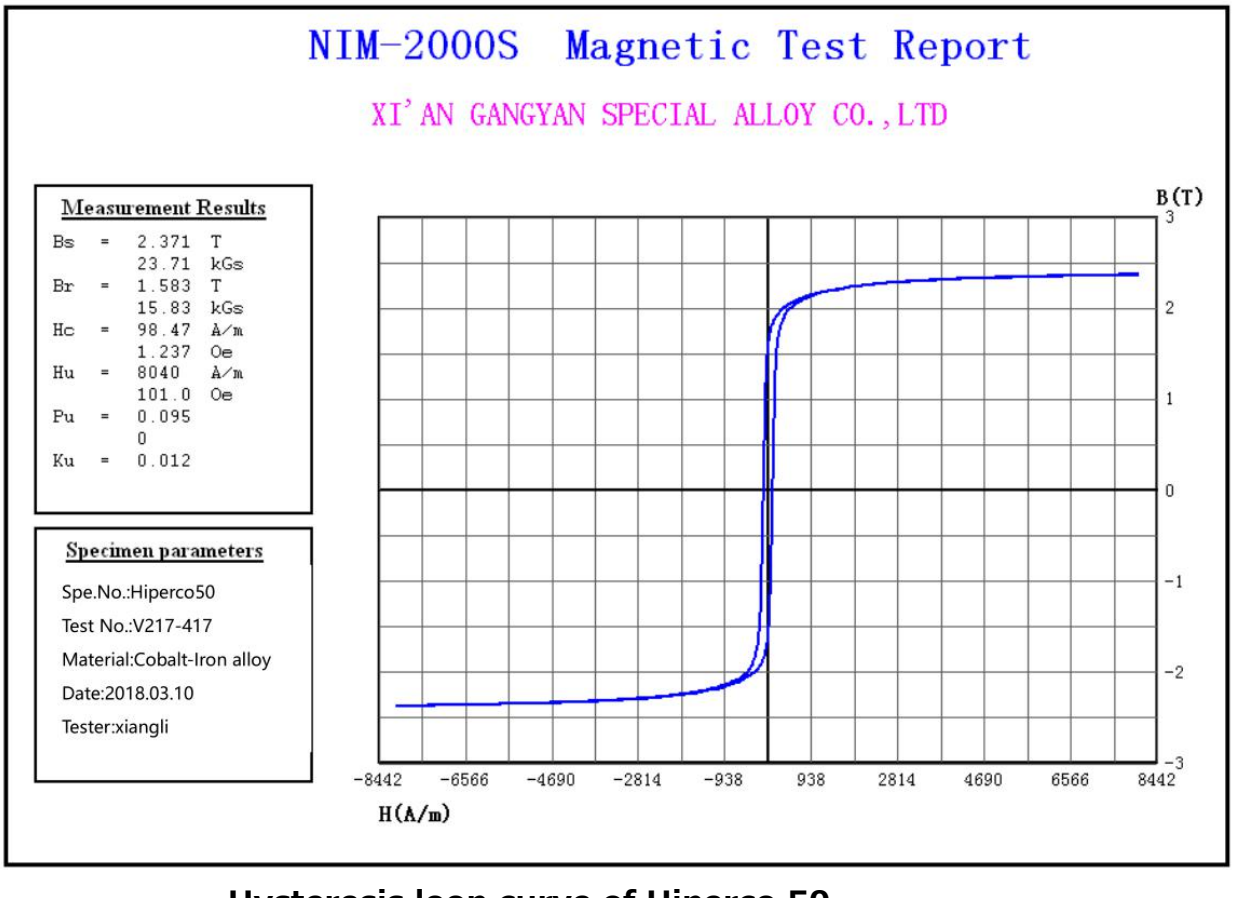
Forms	Size/mm	Magnetic induction at different magnetic field B,≥(T)				Coercivity
		B800(A/m)	B1600(A/m)	B4000(A/m)	B8000(A/m)	Hc,≤ (A/m)
Cold Rolling Strip	All	2.00	2.10	2.20	2.25	128
Rod	Over 25.4	1.50	1.75	1.95	2.15	144

Remarks :

1) Specification**:** ASTM A801 UNS R30005 Alloy type 1

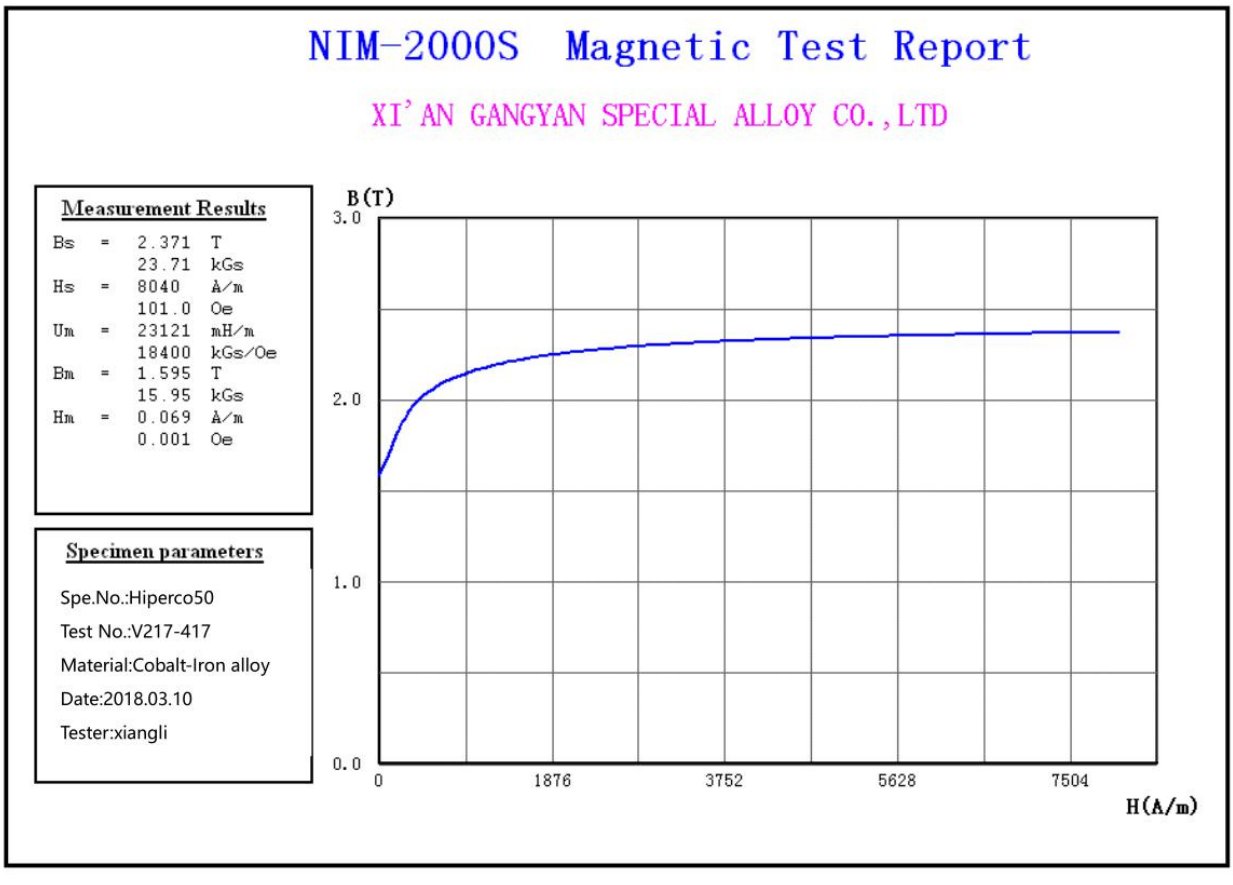
2) Higher Magnet property possible, Can be engineered according to specific customer requirements.

Hysteresis loop curve



Hysteresis loop curve of Hiperco 50 (Dia.100.0 mm)

Magnetization curve



Magnetization curve of HiperCo50 (Dia.100.0 mm)

TABLE 4 Dimensional Tolerances for Ground Rods

Specified Diameter(mm)	Variation in Diameter ±mm
Under12.7 to 7.94	0.064
Under 25.4 to 12.7	0.064
Under38.1 to 25.4	0.076
101 to 38.1	0.13

TABLE 4.1 Thickness Tolerances for Cold-Rolled Strip

	Permissible Variations in Thickness, ±mm	
Specified Thickness,mm	Width≤152	Width > 152
0.051 to 0.10	0.0051	0.0076
0.10 to 0.15	0.0076	0.010
0.16 to 0.254	0.013	0.019
0.257 to 0.356	0.025	0.038
0.358 to 0.635	0.038	0.051
0.635 to 1.52	0.051	0.076

TABLE 4.2 Coil Width Tolerances for Cold-Rolled Strip

	Permissible Variations in Thickness, ±mm	
Specified Thickness,mm	Width≤152	Width > 152
0.05 to 1.52	0.13	0.010

TABLE 5 DC MAGNETIC PROPERTY

	Alloy Type 1 UNS R3005	Alloy Type 1 UNS R30005
Products forms	Strip	Round Rod
Products size,(mm)	0.35	13.5
Heat Treatment Temperature,℃	845	845
Magnetic Field Strength,(A/m)	FLUX DENSITY,(T)	
160	1.35	0.25
400	1.95	...
800	2.10	1.70
1600	2.20	2.00
4000	2.23	2.20
6000	2.25	2.25
8000	2.30	2.30
Coercive field strength,(A/m)[A]	72	160
Residual induction,(T)[A]	1.45	1.00

TABLE 6 400Hz Core Losses for strip

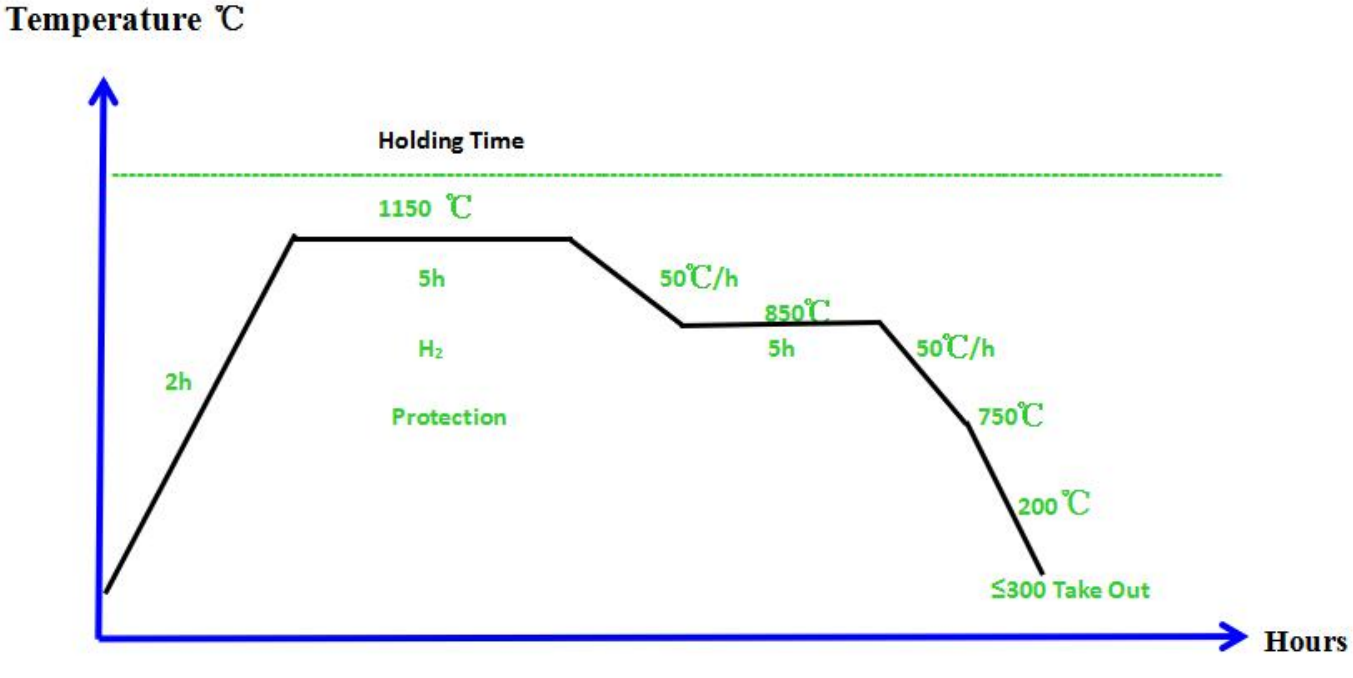
		Alloy Type 1(UNS R30005)		
Heat Treatment Temperature,℃	Strip Thickness mm	Core Loss,(W/kg) at Specified Maximum Flux Density		
		1.0T	1.5T	2.0T
845	0.36	22	42	75
845	0.25	18	33	55
845	0.15	15	26	44
845	0.10	13	20	29
845	0.05	15	22	35
750	0.36	26	53	97
750	0.25	20	40	66
750	0.15	18	35	60

TABLE 7 Mechanical Properties

Alloy Type 1(UNS R30005)			
Condition	0.2% Yield Stress MPa	Ultimate Tensile Strength MPa	%Elongation 50mm
Cold-rolled strip	1280	1340	1
Strip annealed at 845℃	240	480	4
Strip annealed at 750℃	360	590	5
Strip annealed at 715℃	550	717	5
Rod annealed at 845℃	...	480	...

Further-Process (Heat Treatment)

Use a non-oxidizing ,non-carburizing atmosphere such as dry hydrogen,argon,or equivalent ,or a Vacuum. Appropriate safety precaution must be taken when working with highly flammable atmospheres.



Recommending Heat Treatment Method for Hiperco 50 Rod/Plate (Components)

TABLE 8 APPLICATION EXAMPLES

Material	Application Examples
Hiperco 50	Special Motors for the Aerospace Industry; Electromagnets for medical applications; Electrical Generators; Specialty Transformers; Pole Pieces for Electromagnets; Magnetic Bearings; High Magnetic Flux Devices and Instruments.

Examples of Parts made from Hiperco 50 Alloy ,stamped lamination assemblies for motors and generators.

Forms of Supply

The soft magnetic alloy Hiperco 50® are available in many shapes and dimensions, supplying semi-finished products in forms of Strip,plate & Rods.
The following table provides an overview of the availability of our material in the various forms of supply.

SEMI-PRODUCT	Hiperco 50 UNS R30005	Size Range mm
Strip	V	0.05 to 1.52
Rod	V	20 to 180
Plate	V	8.0 to 40.0

V=Available ,
1) Delivery state: “Annealed” possible for strip

Hiperco 50 with 50% of cobalt ,are available in Hard or cold-rolled condition for strip. Rod in hot rolling or forging condition,plate in cold rolled or hot rolled or forging condition.

Chemical composition,Physical and Magnetic properties will be engineered according to specific customer requirements.Therefore chemical composition,physical and magnetic properties might be different to values listed in this document.

Information about product characteristics or applicability of materials are shown only for informative purposes.

If you still have questions about the material , do not hesitate to contact us at
Supportsales@xagy.cn with any specific questions.