



XAGY®

Xi'an GangYan Special Alloy Co.,Ltd.

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# Soft Magnetic Iron-Cobalt Alloy

## Hiperco 27

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## INTRODUCTION

A ductile-high-magnetic saturation alloy which has been used in magnetic flux-carrying members, magnetic pole caps, and laminations for aircraft motors and generators.

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**Table 1**                      **Composition and executive standard**

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<b>Material</b>	<b>Composition % by weight(Nominal Composition)</b>	<b>ASTM A 801</b>
Hiperco 27	Co27 Cr0.50 Fe Balance	Alloy Type 2

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## key feature

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Highest Saturation magnetic induction

Higher curie temperature

High magnetic flux densities

High magnetostrictive coefficient

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

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**Table 2 Physical Properties**

**Alloy Type 2**  
UNS K92650

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Density,g/cm <sup>3</sup>	7.95
Electrical resistivity,μΩm	0.19
Curie Temperature,°C	925
Saturation magnetostriction,10 <sup>-10</sup>	36
Saturation induction,(T)	2.36
Modulus of elasticity,psi	24x10 <sup>6</sup>
<b>Thermal Expansivity,10<sup>-6</sup>/°C</b>	
20 to 100	9.8
20 to 200	10.1
20 to 300	10.3
20 to 400	10.6
20 to 500	10.9
20 to 600	10.9
20 to 700	...
20 to 800	...

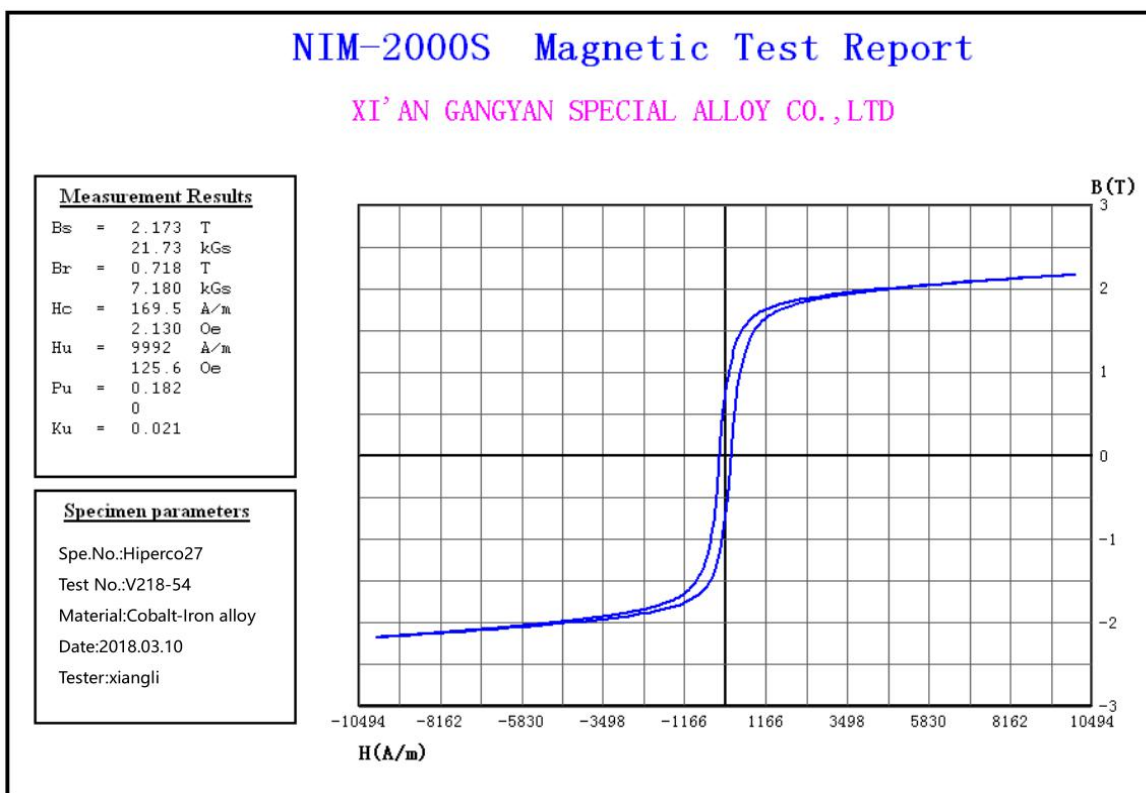
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### 3 DC MAGNETIC PROPERTY

Alloy Type 2 (UNS K92650)

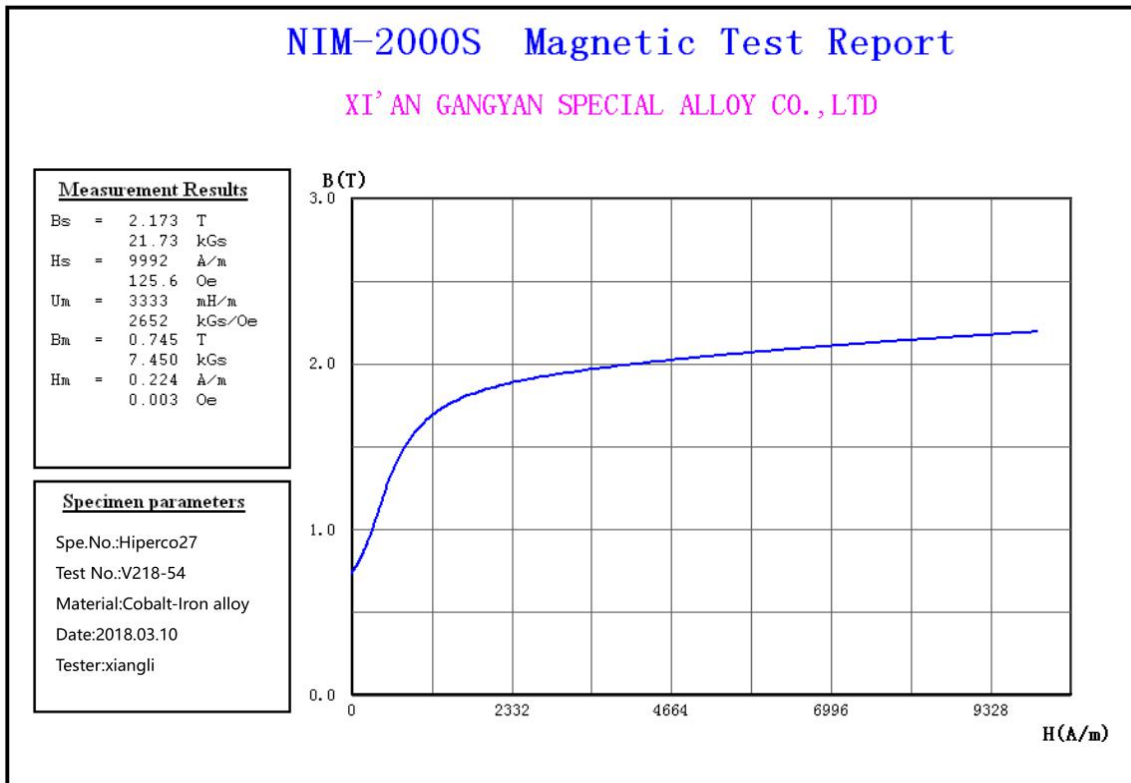
Forms	Size/mm	Magnetic induction at different magnetic field $B, \geq (T)$				Coercivity $H_c, \leq (A/m)$
		B4000(A/m)	B8000(A/m)	B12000(A/m)	B16000(A/m)	
Cold Rolling Strip	All	1.87	2.03	2.12	2.17	140
Rod	Over 25.4	1.10	1.75	1.95	2.10	160

### Hysteresis loop curve



Hysteresis Loop Curve of Hiperco 27 (Dia.115.0mm)

## Magnetization curve



**Magnetization curve of HiperCo27 (Dia.115.0mm)**

**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

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**TABLE 4.1 Thickness Tolerances for Cold-Rolled Strip**

Specified Thickness,mm	Permissible Variations in 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**

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

**TABLE 5 DC MAGNETIC PROPERTY**

	Alloy Type 2 UNS K92650	Alloy Type 2 UNS K92650
Products forms	Strip	Round Rod
Products size,(mm)	0.35	12.7
Heat Treatment Temperature, °C	845	925
Magnetic Field Strength,(A/m)		FLUX DENSITY,(T)
160	0.50	...
400	...	...
800	1.35	1.10
1600	1.70	1.40
4000	1.92	1.85
6000	2.10	1.95
8000	2.15	2.05
Coercive field strength,(A/m) <sup>4</sup>	140	240
Residual induction,(T) <sup>A</sup>	0.85	0.60

**TABLE 6 400Hz Core Losses for strip**

Alloy Type 2(UNS k92650)				
Heat Treatment Temperature, °C	Strip Thickness mm	Core Loss,(W/kg) at Specified Maximum Flux Density		
		1.0T	1.5T	2.0T
845	0.36	37	77	140
845	0.25	29	55	110
750	0.36	40	82	150
750	0.25	33	60	120

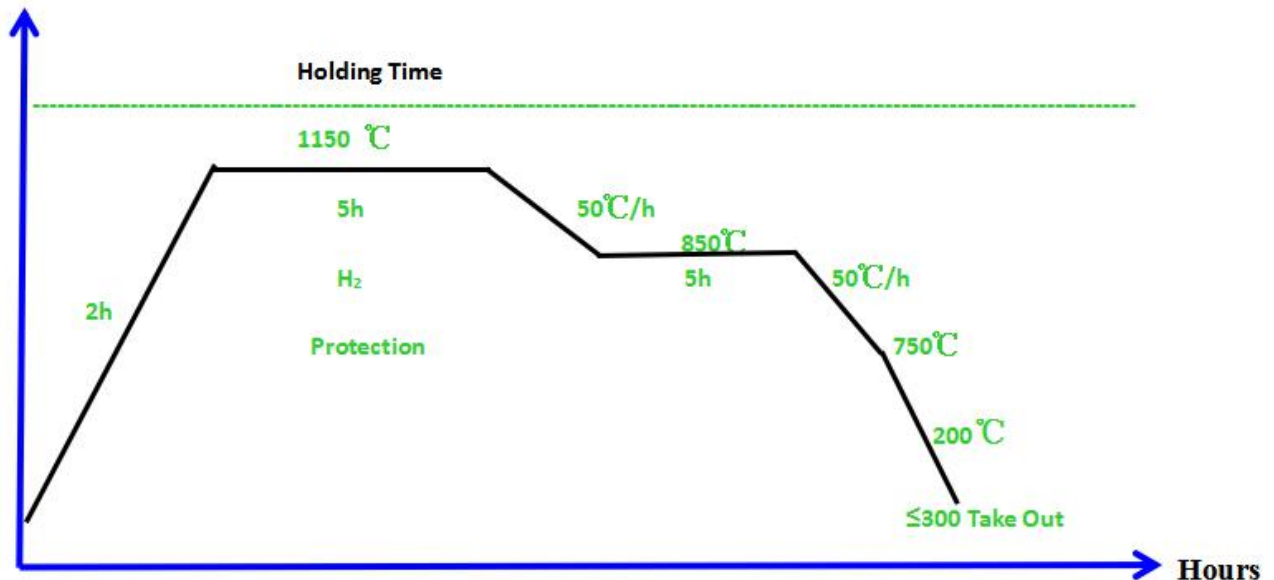
**TABLE 7 Mechanical Properties**

<b>Alloy Type 2(UNS K92650)</b>			
Condition	0.2% Yield	Ultimate Tensile	%Elongation 50mm
	Stress MPa	Strength MPa	
Cold-rolled strip	1140	1150	7
Strip annealed at 845°C	280	550	12
Strip annealed at 750°C	340	620	15

**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.

Temperature °C



**Recommending Heat Treatment Method for Hiperco 27 Rod/Plate (Components)**



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**TABLE 8**                      **APPLICATION EXAMPLES**

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Material	Application Examples
Hiperco 27	motors, generators, pole pieces, relays and magnetic bearings.

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Examples of Parts made from Iron-Cobalt Alloy ,stamped lamination assemblies for motors and generators.

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## Forms of Supply

The soft magnetic alloy Fe-Co material 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.

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<b>SEMI-PRODUCT</b>	<b>Hiperco 27 UNS K92650</b>	<b>Size Range mm</b>
<b>Strip</b>	<b>V</b>	0.05 to 1.52
<b>Rod</b>	<b>V</b>	20 to 180
<b>Plate</b>	<b>V</b>	5.0 to 40.0

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**V**=Available ,

1) Delivery state: Hard or soft possible for strip

The alloys with 27% of cobalt ,are only available in hard or cold-rolled condition,soft state also possible.  
Rod in hot rolling or forging condition,plate in cold rolled or hot rolled condition.

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](mailto:Supportsales@xagy.cn) with any specific questions.