



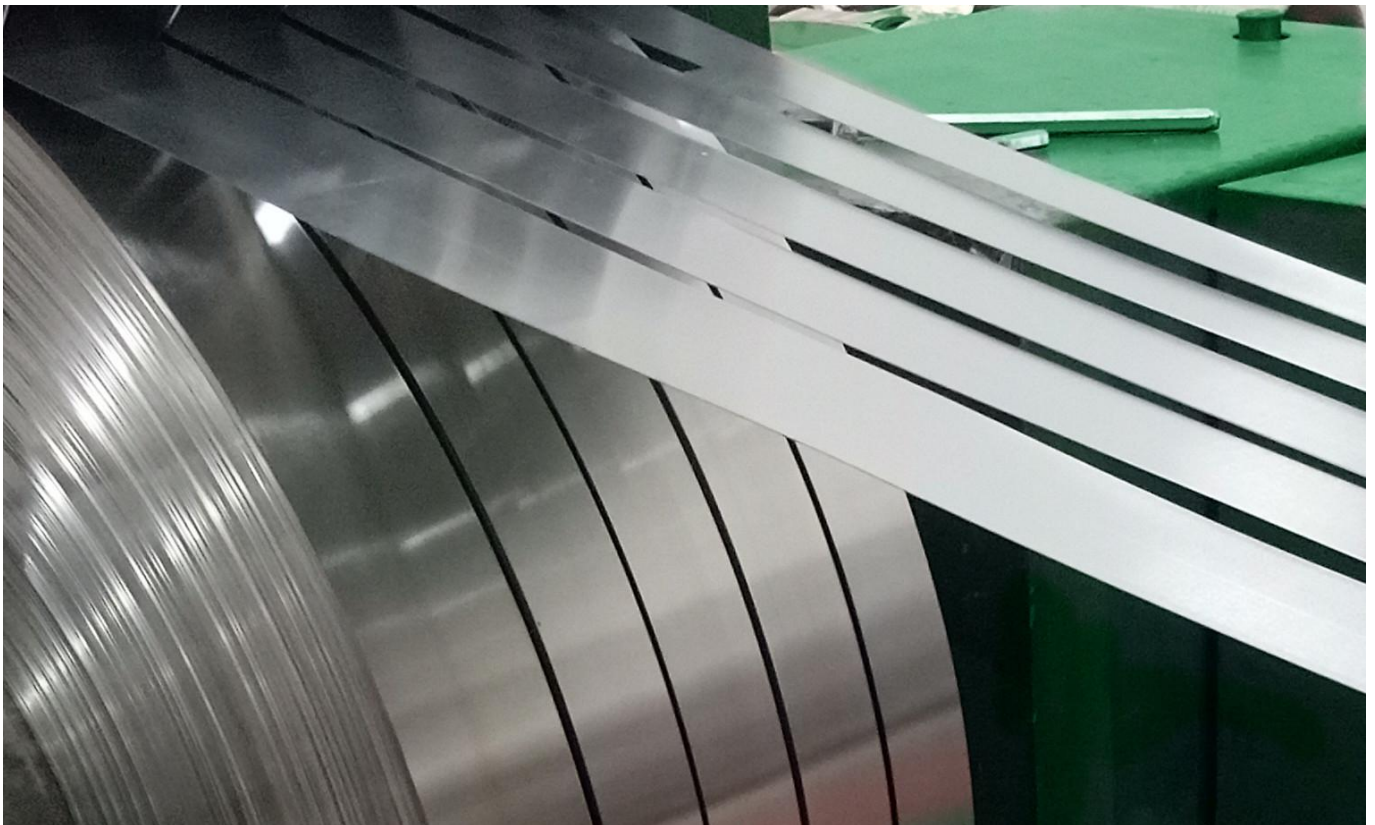
XAGY®

XI'AN GANGYAN SPECILA ALLOY CO.,LTD.

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# Soft Magnetic Iron-Nickel Alloys High Permeability HyMu 80

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## 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.

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**TABLE 1                      COMPOSITION & EXECUTIVE STANDARD**

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<b>Material</b>	<b>Composition % by weight (Nominal Composition)</b>			<b>Standard</b>
<b>HyMu 80</b>	<b>Mo3.8-4.1</b>	<b>Ni78.5-80.0</b>	<b>Fe Remainder</b>	<b>GBn198-88</b>

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1. Equivalent to ASTM A753 Alloy type 4(Mo4) ,MIL-N-14411C Composition 1
2. Custom-Made as per standard

®Registered trademark of **XAGY**

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## KEY FEATURE

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High Initial Permeability

Low Coercivity loss

Good formability and weldability

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### TABLE 2 PHYSICAL PROPERTIES

Material	Density,g/cm <sup>3</sup>	Resistivity,μΩm	Curie Point,°C	High saturated magneto-striction coefficient 10 <sup>-6</sup>
HyMu 80	8.60	0.55	450	2

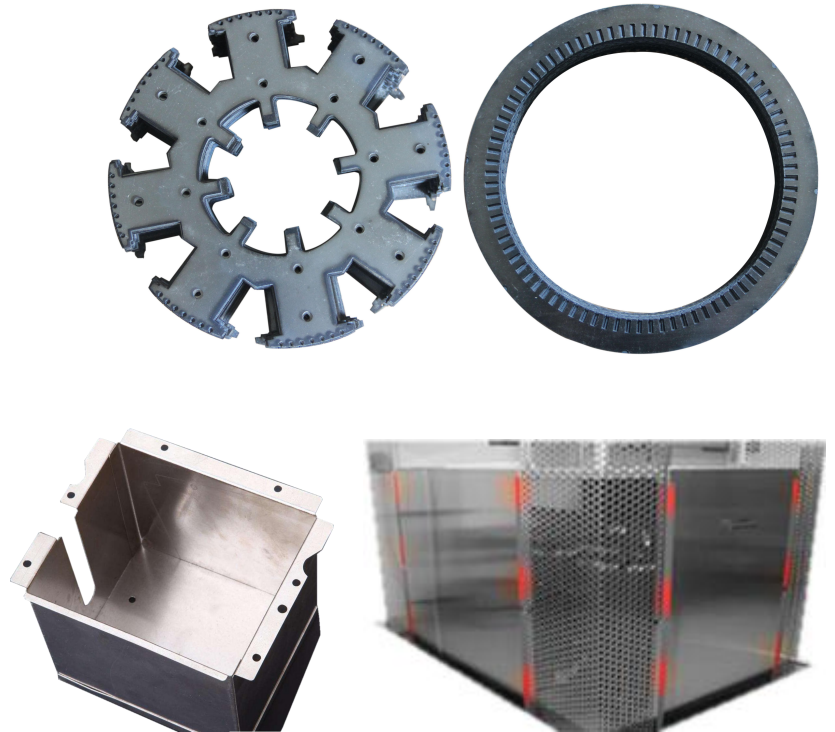
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Temperature Range,°C	Thermal expansivity,x10 <sup>-6</sup> /K
20 to 100	10.3-10.8
20 to 200	10.9-11.2
20 to 300	11.4-12.9
20 to 400	11.9-12.5
20 to 500	12.3-13.2
20 to 600	12.7-13.4
20 to 700	13.1-13.6
20 to 800	13.4-13.6
20 to 900	13.2-13.7

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**TABLE 3****APPLICATION EXAMPLES**

<b>Material</b>	<b>Application Examples</b>
<b>HyMu 80</b>	Magnetic shielding, transformer laminations, motor laminations, stepping motors, Shielding rooms.



Examples of Parts made from HyMu 80 ,stamped lamination assemblies for motors and generators,shielding box and shielding rooms.

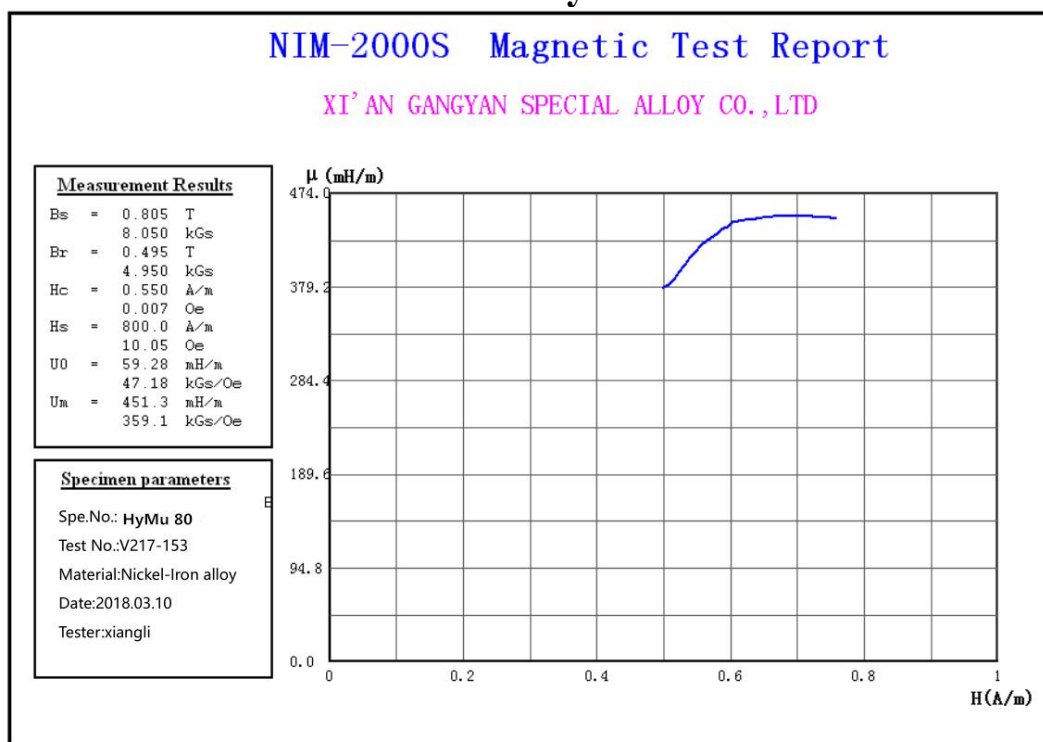
## 4.2 MAGNETIC PROPERTY

### Material

### HyMu 80

Thickness & Diameter/mm	$\mu_{0.08} \geq$ (mH/m)	$\mu_{m \geq}$ (mH/m)	$B_s \geq$ (T)	$H_c \leq$ (A/m)
<b>Grade A</b>				
0.05 to 0.09	22.5	173.5	0.75	2.8
0.10 to 0.19	25.0	162.5	0.75	2.0
0.20 to 0.34	28.0	225.0	0.75	1.6
0.35 to 1.00	30.0	250.0	0.75	1.2
1.10 to 2.50	27.5	225.0	0.75	1.6
2.50 to 3.00	26.3	187.5	0.75	2.0
<b>Grade B</b>				
0.05 to 0.09	25.0	150.0	0.75	2.0
0.10 to 0.19	27.5	187.5	0.75	1.6
0.20 to 0.34	31.3	250.0	0.75	1.2
0.35	32.5	275	0.75	0.96
<b>Grade C</b>				
0.05 to 0.09	38.0	250.0	0.73	1.2
0.10 to 0.19	38.0	250.0	0.73	1.2
0.20 to 0.34	38.0	280.0	0.73	1.0
0.35	44.0	310.0	0.73	1.0
<b>Forging (Bar)</b>				
30 to 120	3.1	31.3	1.50	14.4

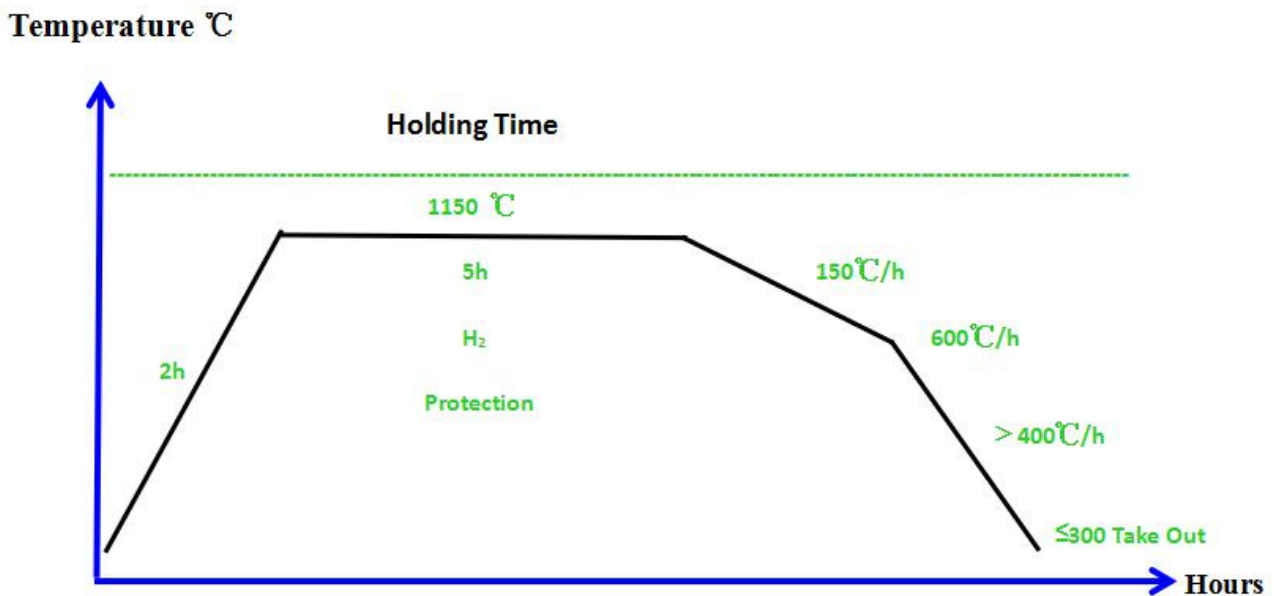
### Permeability Curve



Permeability curve of HyMu 80 ( $\delta=1.0\text{mm}$ )

## Further Process-(Heat Treatment)

Use a non-oxidizing 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 HYMU 80 ,Rod / plate / Strip (Components)

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## Annealing VS Heat-treatment

The definition of annealing is: "heat metal and allow it to cool slowly, in order to remove internal stresses and toughen or soften it." While we need to anneal Them and other magnetic shielding alloys during the magnetic shield fabrication process, we do not anneal for maximum magnetic permeability. As noted in the definition, the annealing step is done to relieve stress within the material that was introduced as a part was being formed or bent.

When we are heat-treating our HyMu 80 magnetic shielding materials, we are actually changing the physical properties by enlarging the grain structure, allowing for more magnetic flux to be absorbed by the magnetic shield.

In conclusion, both annealing and heat-treating are necessary during the magnetic shield fabrication process, but both serve a very different purpose. If you need to relieve stress in material, soften or toughen it, you want to anneal it. If you are trying to achieve maximum permeability, you want to heat treat the material.

It should also be noted that material in our kinds have been Non-annealed &annealed for forming, but is not heat-treated for maximum magnetic permeability.

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.

## Forms Of Supply

The soft magnetic alloy HyMu 80 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.

Material	Rods	Strip	Plate
HyMu 80	V Dia.20 to 120(mm)	V Thickness 0.1 to 1.8(mm)	V Thickness 1.8 to 40(mm)

**V=available**

Delivery state " Annealed" possible for strip