

# Thin gauge non-oriented silicon steel sheets with excellent medium and high frequency magnetic properties

(AHR series)

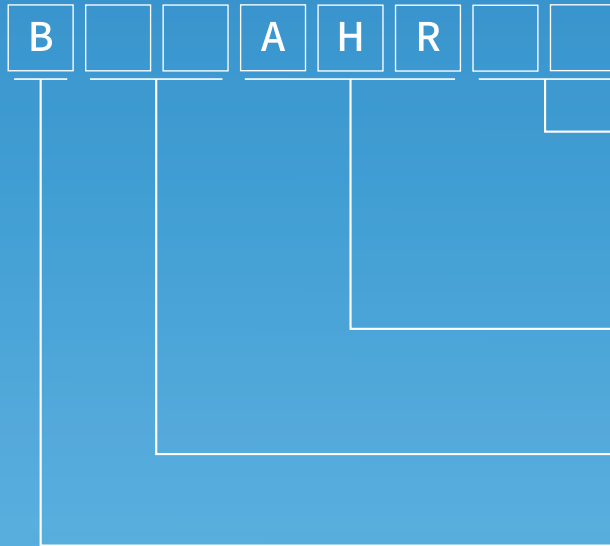


## Technical Manual

- ◆ Ultra-thin nominal thickness
- ◆ Excellent magnetic properties
- ◆ Outstanding cross section
- ◆ Wide frequency application field

**BeCOREs**

# 01 Brand naming



## Product Series

"-1": Represents Type I, a general-purpose type that can meet the needs of most application scenarios

"-2": Represents Type II, the superior type, designed for specific higher performance requirements

## Indicates non-oriented silicon steel type

AHR: Emerging economic fields represented by humanoid robots and low-altitude aircraft

100 times the nominal thickness, in millimeters

Initial of Baosteel

# 02 Standard of Properties

Grade	Thickness (mm)	Max.Core Loss $P_{1.0/400}$ (W/kg)	Min.Magnetic Polarization $J_{5000}$ (T)	Min.Stacking Factor (%)	Min.Number of Bends (Times)	Density (kg/dm <sup>3</sup> )
B10AHR-1	0.10	10.0	1.63	0.91	5	7.65
B10AHR-2	0.10	10.0	1.66	0.91	5	7.65
B15AHR-1	0.15	11.0	1.64	0.92	5	7.65
B15AHR-2	0.15	11.0	1.67	0.92	5	7.65
B20AHR-1	0.20	12.0	1.65	0.93	5	7.65
B20AHR-2	0.20	12.0	1.68	0.93	5	7.65
B20AHR-3	0.20	14.0	1.73	0.93	5	7.75
B20AHR-4	0.20	20.0	1.79	0.93	5	7.85
B27AHR-1	0.27	14.0	1.67	0.94	5	7.65
B30AHR-1	0.30	20.0	1.74	0.94	5	7.75
B30AHR-2	0.30	15.0	1.68	0.94	5	7.65

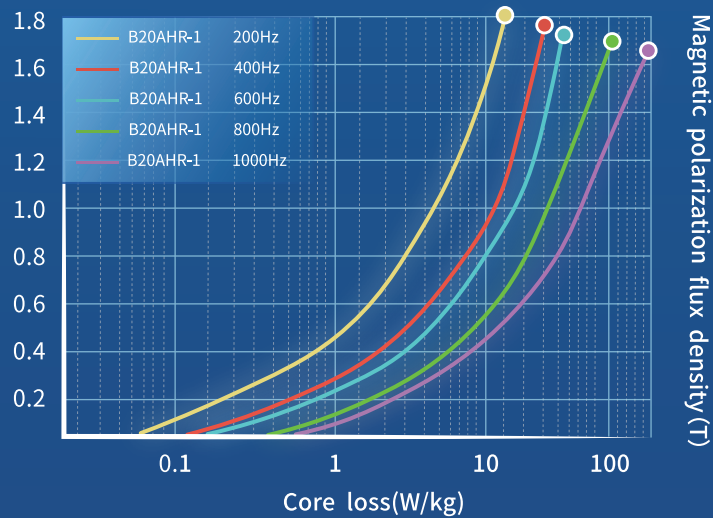
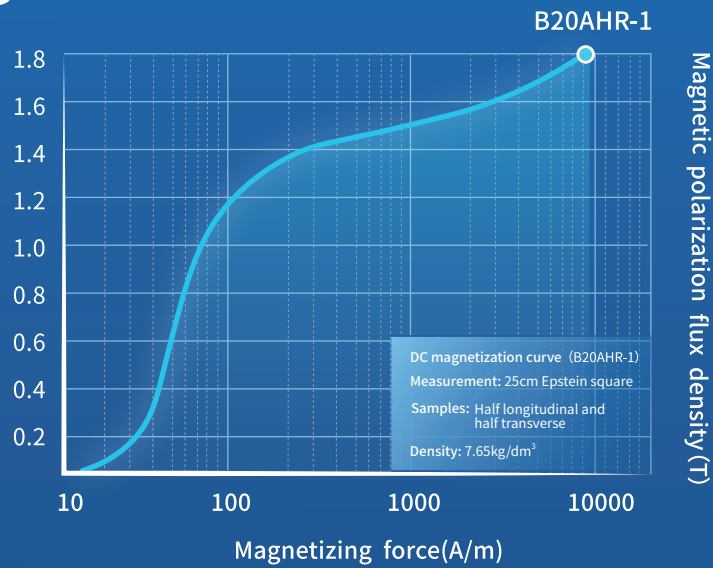
## Typical Magnetic Properties

Grade	Thickness (mm)	Density (kg/dm <sup>3</sup> )	Core Loss (W/kg)					Magnetic Polarization (T)		
			P <sub>1.0/400</sub>	P <sub>1.5/400</sub>	P <sub>1.0/600</sub>	P <sub>1.0/800</sub>	P <sub>1.0/1000</sub>	J <sub>1000</sub>	J <sub>2500</sub>	J <sub>5000</sub>
B10AHR-1	0.10	7.65	9.5	22.6	15.3	22.2	29.6	1.45	1.55	1.65
B10AHR-2	0.10	7.65	9.2	22.0	14.4	20.2	28.2	1.50	1.58	1.68
B15AHR-1	0.15	7.65	9.8	23.5	16.8	25.9	34.9	1.49	1.56	1.66
B15AHR-2	0.15	7.65	9.5	23.0	16.3	24.4	33.5	1.51	1.59	1.69
B20AHR-1	0.20	7.65	10.8	26.5	19.4	29.8	41.6	1.51	1.58	1.68
B20AHR-2	0.20	7.65	10.5	24.7	18.8	28.6	39.7	1.52	1.60	1.70
B20AHR-3	0.20	7.75	12.5	27.9	22.2	34.0	47.8	1.57	1.67	1.75
B20AHR-4	0.20	7.85	19.2	41.9	34.3	52.3	73.7	1.64	1.73	1.81
B27AHR-1	0.27	7.65	13.0	30.2	22.8	35.4	50.7	1.51	1.60	1.69
B30AHR-1	0.30	7.75	18.3	43.1	52.6	74.9	74.2	1.52	1.67	1.75
B30AHR-2	0.30	7.65	13.8	32.7	24.7	39.0	55.6	1.51	1.61	1.70

## Typical Mechanical Properties

Grade	Thickness (mm)	Yield Strength (MPa)	Tensile Strength (MPa)	Elongation (%)	Hardness HV1 (N/mm <sup>2</sup> )
B10AHR-1	0.10	400	515	15	/
B10AHR-2	0.10	430	535	11	/
B15AHR-1	0.15	395	510	18	/
B15AHR-2	0.15	400	500	15	/
B20AHR-1	0.20	390	500	22	200
B20AHR-2	0.20	390	500	21	215
B20AHR-3	0.20	275	400	26	153
B20AHR-4	0.20	206	340	39	106
B27AHR-1	0.27	438	554	20	220
B30AHR-1	0.30	275	400	25	165
B30AHR-2	0.30	436	555	19	221

# Magnetizing curve



# Recommended coating

Insulation coating type	Symbol	Characteristics
Semi-organic thin film coating	A	Good punchability, good weldability, with Cr
Semi-organic heavy film coating	H	Good punchability, high interlaminar resistance, with Cr
Semi-organic chromium-free thin film coating	K	Good weldability, chromium-free and environmentally friendly, suitable for dispensing process
Self-bonding coating	Z	After curing, it has good post-adhesion performance, and the iron core has high fixing strength, Cr free

# 07 Coating Characteristics



Coating type symbol	Recommended coating				Remarks	
	A	H	K	Z		
	Conventional (with Cr)		Environmental friendly (Cr free)			
Comparable to ASTM coating	C-5	C-5	C-5	C-3		
Coating type	Semi organic coating			organic coating		
Coating thickness (μm/side)	0.2~0.5	0.5~1.0	0.3~0.7	0.5~2.0		
Coating insulation resistance (Ω·cm <sup>2</sup> /sheet)	≥1	≥3	≥1	≥5	Interlaminar resistance(10 contact buttons,total contact area:6.45cm <sup>2</sup> )	
Adhesion	A	B	A	A		
Punchability (×1000) quantity with punched piece burr height exceed 50μm	1000	1500	1000	—	Material of die:tool steel, Shape of punch: Φ15mm dia, Gap: 5% of sheet thickness, Punch oil:applied	
Oil-proof	Pass	Pass	Pass	Pass		
Weldability (cm/min) maximum welding speed with numbers of blow holes less than 7	80~100	20~60	80~100	Not recommended	Welding method: TIG Welding current:120A Electrode:Th-W 2.4mm Φ Gap between electrode:1.5 mm Clamping pressure:100 kg/cm <sup>2</sup>	
Resistant to heat	Permanently in air	180°C	180°C	180°C	155°C	DIN IEC 60404-12
	Short time in air	210°C×2500hr 600°C×30min	210°C×2500hr 600°C×30min	210°C×2500hr 600°C×30min	160°C×2500hr 180°C×1000hr	

## Standard dimensions

Nominal Thickness (mm)	Nominal Width (mm)	Inner Diameter (mm)
0.10、0.15	800~1200	508
0.20、0.27、0.30	900~1250	508

## Dimension and shape tolerances

Nominal Thickness (mm)	Nominal Thickness Tolerance (mm)	Longitudinal Thickness Deviation (mm)	Transverse Thickness Deviation (mm)
0.10、0.15、0.20	+0.006 -0.010	$\leq 0.006$	$\leq 0.006$
0.27	+0.010 -0.020	$\leq 0.008$	$\leq 0.008$
0.30	+0.010 -0.025	$\leq 0.010$	$\leq 0.010$

Nominal Width (mm)	Width Tolerance (mm)		Flatness (%)	Camber within 2m (mm)
	Cut edge	Mill edge		
$900 \leq L \leq 1000$	0~+1.0	0~+5	$\leq 1.5$	$\leq 2.0$
$1000 \leq L \leq 1250$	0~+1.5			

# Typical application



Embodied Intelligence  
Frameless torque motor

Low-altitude economy  
motor

AHR  
series products

Dexterous hands  
Brushless Hollow Cup Motor

Precision equipment  
Miniature  
high-efficiency motor

# Material selection recommendation

Frameless torque motor	Aircraft power motor	Brushless Hollow Cup Motor	Other types of micro motors
<p>Recommended brand</p> <ul style="list-style-type: none"> <li>B20AHR-1</li> <li>B20AHR-2</li> <li>B20AHR-3</li> <li>B20AHR-4</li> <li>B27AHR-1</li> <li>B30AHR-1</li> <li>B30AHR-2</li> </ul>	<p>Recommended brand</p> <ul style="list-style-type: none"> <li>Heavy-duty trucks</li> <li>B20AHR-1</li> <li>B27AHR-1</li> <li>Racing type</li> <li>B10AHR-2</li> <li>B15AHR-2</li> <li>B20AHR-4</li> </ul>	<p>Recommended brand</p> <ul style="list-style-type: none"> <li>B10AHR-1</li> <li>B10AHR-2</li> <li>B15AHR-1</li> <li>B15AHR-2</li> <li>B20AHR-1</li> </ul>	<p>Recommended brand</p> <p>Further recommendations will be made based on the application scenario</p>

**BAOSHAN IRON & STEEL CO., LTD.**<http://www.baosteel.com>**Silicon Steel Sales Department**Address: No. 151, Mohe Road,  
Baoshan District, Shanghai

Postal code: 201999

TEL: 021-26642629

**Baosteel Service Hot-line**

400-820-8590

**iBaosteel**<http://www.ibaosteel.com>**Domestic Sales Channels****SHANGHAI BAOSTEEL****STEEL PRODUCTS TRADING CO., LTD.**

TEL: 021-26640916

**GUANGZHOU BAOSTEEL****SOUTHERN TRADING CO., LTD.**

TEL: 020-32219999

**BEIJING BAOSTEEL****NORTHERN TRADING CO., LTD.**

TEL: 010-56512000

**CHENGDU BAOSTEEL****WESTERN TRADING CO., LTD.**

TEL: 028-85335388

**WUHAN BAOSTEEL****CENTRAL CHINA TRADING CO., LTD.**

TEL: 027-84298800

**SHENYANG BAOSTEEL****NORTH-EASTERN TRADING CO., LTD.**

TEL: 024-31391180

**ANHUI BAOSTEEL****STEEL PRODUCTS TRADING CO., LTD.**

TEL: 0551-65227783

**Northeast Asia and Oceania Region****HOWA TRADING CO., LTD.**

TEL: 0081-3-32379121

FAX: 0081-3-32379123

**SEOUL OFFICE**

TEL: 0082-2-5080893

FAX: 0082-2-5080891

**BGM CO., LTD**

TEL: 0082-70-44225903

FAX: 0082-31-3514558

**KAOHSIUNG OFFICE**

TEL: 00886-7-3356606

FAX: 00886-7-3356609

**BAO AUSTRALIA PTY LTD.**

TEL: 0061-8-94810535

FAX: 0061-8-94810536

**South East Asia and South Asia Region****BAOSTEEL SINGAPORE PTE LTD.**

TEL: 0065-63336818

FAX: 0065-63336819

**VIETNAM OFFICE**

TEL: 0084-8-9100126

FAX: 0084-8-9100124

**THAILAND OFFICE**

TEL: 0066-2-6368485

FAX: 0066-2-2348989

**HANOI OFFICE**

TEL: 0084-24-62694200

FAX: 0084-24-62691392

**PT. BAOSTEEL INDONESIA STEEL SERVICE CENTER  
(INDONESIA OFFICE)**

TEL: 0062-21-3040 8575

FAX: 0062-21-3040 8583

**BAOSTEEL INDIA COMPANY PRIVATE LTD.  
(SANAND STEEL SERVICE CENTER)**

TEL: 0091-22-30071700

FAX: 0091-22-30071777

**MALAYSIA OFFICE**

TEL: 0060-32-2016986

**Europe, Africa & Middle East Region****BAOSTEEL EUROPE GMBH**

TEL: 0049-89-32709090

FAX: 0049-89-3270909130

**BAOSTEEL ITALIA DISTRIBUTION CENTER SPA**

TEL: 0039-010-530881

FAX: 0039-010-5308895

**BAOSTEEL ESPAÑA, S.L.**

TEL: 0034-93-4119325

FAX: 0034-93-4119330

**BAOSTEEL MIDDLE EAST FZE**

TEL: 00971-4-8840458

FAX: 00971-4-8840485

**RUSSIA OFFICE**

TEL: 7-499-2585602

FAX: 7-499-2585602

**KENYA OFFICE**

TEL: 00254-708678798

FAX: 0027-11-7842408

**TÜRKIYE OFFICE**

TEL: 0090-212-3440067

FAX: 0090-212-3440068

**SAUDI ARABIA OFFICE**

TEL: 00966-502894656

**TUNISIA OFFICE**

TEL: 00216-36013995

**America Region****BAOSTEEL AMERICA INC.**

TEL: 001-201-3073355

FAX: 001-201-3073358

**BAOSTEEL DO BRAZIL LTDA.**

TEL: 0055-11-26678869

**CANADA OFFICE**

TEL: 001-905-7315888/7315885

FAX: 001-905-7315883

**SAN DIEGO OFFICE**

TEL: 001-949-7526789

FAX: 001-949-7521234

**MEXICO OFFICE**

TEL: 0052-55-55319506

FAX: 0052-55-55319506-201

**PANAMA OFFICE**

TEL: 507-382-5225

**MONTERREY OFFICE**

TEL: 0052-81-12537111

