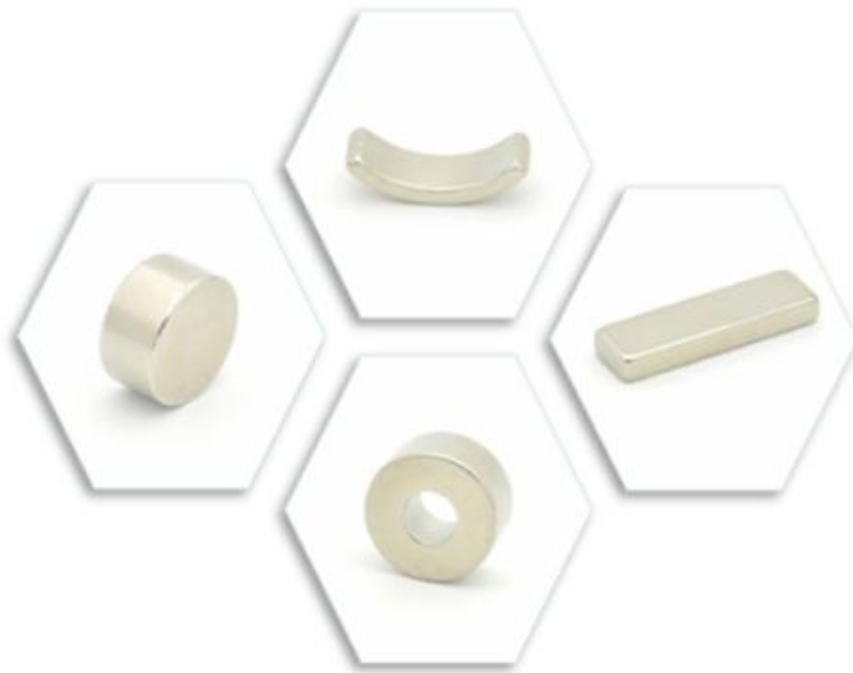


# Sintered NdFeB Magnets' Specifications



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**Table I Sintered NdFeB Grades and Their Magnetic Properties**

| Grade | $B_r$     |           | $H_{cb}$    |             | $H_{cj}$  |             | $(BH)_{max}$ |                 | $T_w$              |         |            |
|-------|-----------|-----------|-------------|-------------|-----------|-------------|--------------|-----------------|--------------------|---------|------------|
|       | kGs       | T         | kOe         | kA/m        | kOe       | kA/m        | MGOe         | $\text{kJ/m}^3$ | $^{\circ}\text{C}$ |         |            |
| N52   | 14.2-14.8 | 1.42-1.48 | $\geq 10.5$ | $\geq 836$  | $\geq 11$ | $\geq 876$  | 50-53        | 398-422         | $\leq 80$          |         |            |
| N50   | 13.9-14.4 | 1.39-1.44 | $\geq 10.8$ | $\geq 859$  | $\geq 12$ | $\geq 955$  | 48-51        | 382-406         |                    |         |            |
| N48   | 13.6-14.1 | 1.36-1.41 | $\geq 11.6$ | $\geq 923$  |           |             | 46-49        | 366-390         |                    |         |            |
| N45   | 13.2-13.7 | 1.32-1.37 | $\geq 11.6$ | $\geq 923$  |           |             | 43-46        | 342-366         |                    |         |            |
| N42   | 12.8-13.3 | 1.28-1.33 | $\geq 11.4$ | $\geq 907$  |           |             | 40-43        | 318-342         |                    |         |            |
| N40   | 12.4-12.9 | 1.24-1.29 | $\geq 11.4$ | $\geq 907$  |           |             | 38-41        | 302-326         |                    |         |            |
| N38   | 12.1-12.6 | 1.21-1.26 | $\geq 11.2$ | $\geq 891$  |           |             | 36-39        | 286-310         |                    |         |            |
| N35   | 11.7-12.2 | 1.17-1.22 | $\geq 10.8$ | $\geq 859$  |           |             | 33-36        | 263-286         |                    |         |            |
| N33   | 11.3-11.8 | 1.13-1.18 | $\geq 10.5$ | $\geq 836$  |           |             | 31-34        | 247-271         |                    |         |            |
| N30   | 10.8-11.3 | 1.08-1.13 | $\geq 10.0$ | $\geq 796$  |           |             | 28-31        | 223-247         |                    |         |            |
| N50M  | 13.9-14.4 | 1.39-1.44 | $\geq 13.0$ | $\geq 1035$ |           |             | $\geq 13$    | $\geq 1035$     |                    | 48-51   | 382-406    |
| N48M  | 13.6-14.1 | 1.36-1.41 | $\geq 12.8$ | $\geq 1019$ |           |             | $\geq 14$    | $\geq 1114$     | 46-49              | 366-390 |            |
| N45M  | 13.2-13.7 | 1.32-1.37 | $\geq 12.5$ | $\geq 995$  | 43-46     | 342-366     |              |                 |                    |         |            |
| N42M  | 12.8-13.3 | 1.28-1.33 | $\geq 12.0$ | $\geq 955$  | 40-43     | 318-342     |              |                 |                    |         |            |
| N40M  | 12.4-12.9 | 1.24-1.29 | $\geq 11.6$ | $\geq 923$  | 38-41     | 302-326     |              |                 |                    |         |            |
| N38M  | 12.1-12.6 | 1.21-1.26 | $\geq 11.3$ | $\geq 899$  | 36-39     | 286-310     |              |                 |                    |         |            |
| N35M  | 11.7-12.2 | 1.17-1.22 | $\geq 10.9$ | $\geq 867$  | 33-36     | 263-286     |              |                 |                    |         |            |
| N33M  | 11.3-11.8 | 1.13-1.18 | $\geq 10.5$ | $\geq 836$  | 31-34     | 247-271     |              |                 |                    |         |            |
| N30M  | 10.8-11.3 | 1.08-1.13 | $\geq 10.0$ | $\geq 796$  | 28-31     | 223-247     |              |                 |                    |         |            |
| N50H  | 13.9-14.4 | 1.39-1.44 | $\geq 13.0$ | $\geq 1035$ | $\geq 16$ | $\geq 1273$ | 48-51        | 382-406         | $\leq 120$         |         |            |
| N48H  | 13.6-14.1 | 1.36-1.41 | $\geq 12.8$ | $\geq 1019$ | $\geq 17$ | $\geq 1353$ | 46-49        | 366-390         |                    |         |            |
| N45H  | 13.2-13.7 | 1.32-1.37 | $\geq 12.5$ | $\geq 995$  |           |             | 43-46        | 342-366         |                    |         |            |
| N42H  | 12.8-13.3 | 1.28-1.33 | $\geq 12.0$ | $\geq 955$  |           |             | 40-43        | 318-342         |                    |         |            |
| N40H  | 12.4-12.9 | 1.24-1.29 | $\geq 11.6$ | $\geq 923$  |           |             | 38-41        | 302-326         |                    |         |            |
| N38H  | 12.1-12.6 | 1.21-1.26 | $\geq 11.3$ | $\geq 899$  |           |             | 36-39        | 286-310         |                    |         |            |
| N35H  | 11.7-12.2 | 1.17-1.22 | $\geq 10.9$ | $\geq 867$  |           |             | 33-36        | 263-286         |                    |         |            |
| N33H  | 11.3-11.8 | 1.13-1.18 | $\geq 10.5$ | $\geq 836$  |           |             | 31-34        | 247-271         |                    |         |            |
| N30H  | 10.8-11.3 | 1.08-1.13 | $\geq 10.0$ | $\geq 796$  |           |             | 28-31        | 223-247         |                    |         |            |
| N48SH | 13.6-14.1 | 1.36-1.41 | $\geq 12.8$ | $\geq 1019$ |           |             | $\geq 20$    | $\geq 1592$     | 46-49              | 366-390 | $\leq 150$ |
| N45SH | 13.2-13.7 | 1.32-1.37 | $\geq 12.5$ | $\geq 995$  | 43-46     | 342-366     |              |                 |                    |         |            |
| N42SH | 12.8-13.3 | 1.28-1.33 | $\geq 12.0$ | $\geq 955$  | 40-43     | 318-342     |              |                 |                    |         |            |
| N40SH | 12.4-12.9 | 1.24-1.29 | $\geq 11.6$ | $\geq 923$  | 38-41     | 302-326     |              |                 |                    |         |            |
| N38SH | 12.1-12.6 | 1.21-1.26 | $\geq 11.3$ | $\geq 899$  | 36-39     | 286-310     |              |                 |                    |         |            |
| N35SH | 11.7-12.2 | 1.17-1.22 | $\geq 10.9$ | $\geq 867$  | 33-36     | 263-286     |              |                 |                    |         |            |
| N33SH | 11.3-11.8 | 1.13-1.18 | $\geq 10.5$ | $\geq 836$  | 31-34     | 247-271     |              |                 |                    |         |            |
| N30SH | 10.8-11.3 | 1.08-1.13 | $\geq 10.0$ | $\geq 796$  | 28-31     | 223-247     |              |                 |                    |         |            |

| Grade | $B_r$     |           | $H_{cb}$    |            | $H_{cj}$  |             | $(BH)_{max}$ |                 | $T_w$      |
|-------|-----------|-----------|-------------|------------|-----------|-------------|--------------|-----------------|------------|
|       | kGs       | T         | kOe         | kA/m       | kOe       | kA/m        | MGOe         | $\text{kJ/m}^3$ | °C         |
| N42UH | 12.8-13.3 | 1.28-1.33 | $\geq 12.2$ | $\geq 971$ | $\geq 25$ | $\geq 1990$ | 40-43        | 318-342         | $\leq 180$ |
| N40UH | 12.4-12.9 | 1.24-1.29 | $\geq 11.8$ | $\geq 939$ |           |             | 38-41        | 302-326         |            |
| N38UH | 12.1-12.6 | 1.21-1.26 | $\geq 11.5$ | $\geq 915$ |           |             | 36-39        | 286-310         |            |
| N35UH | 11.7-12.2 | 1.17-1.22 | $\geq 11.1$ | $\geq 883$ |           |             | 33-36        | 263-286         |            |
| N33UH | 11.3-11.8 | 1.13-1.18 | $\geq 10.7$ | $\geq 851$ |           |             | 31-34        | 247-271         |            |
| N30UH | 10.8-11.3 | 1.08-1.13 | $\geq 10.2$ | $\geq 812$ |           |             | 28-31        | 223-247         |            |
| N40EH | 12.4-12.9 | 1.24-1.29 | $\geq 11.8$ | $\geq 939$ | $\geq 30$ | $\geq 2388$ | 38-41        | 302-326         | $\leq 200$ |
| N38EH | 12.1-12.6 | 1.21-1.26 | $\geq 11.5$ | $\geq 915$ |           |             | 36-39        | 286-310         |            |
| N35EH | 11.7-12.2 | 1.17-1.22 | $\geq 11.1$ | $\geq 883$ |           |             | 33-36        | 263-286         |            |
| N33EH | 11.3-11.8 | 1.13-1.18 | $\geq 10.7$ | $\geq 851$ |           |             | 31-34        | 247-271         |            |
| N30EH | 10.8-11.3 | 1.08-1.13 | $\geq 10.2$ | $\geq 812$ |           |             | 28-31        | 223-247         |            |
| N35AH | 11.7-12.2 | 1.17-1.22 | $\geq 11.1$ | $\geq 883$ | $\geq 35$ | $\geq 2786$ | 33-36        | 263-286         | $\leq 230$ |
| N33AH | 11.3-11.8 | 1.13-1.18 | $\geq 10.7$ | $\geq 851$ |           |             | 31-34        | 247-271         |            |
| N30AH | 10.8-11.3 | 1.08-1.13 | $\geq 10.2$ | $\geq 812$ |           |             | 28-31        | 223-247         |            |
| N28AH | 10.4-10.9 | 1.04-1.09 | $\geq 9.8$  | $\geq 780$ |           |             | 26-29        | 207-231         |            |

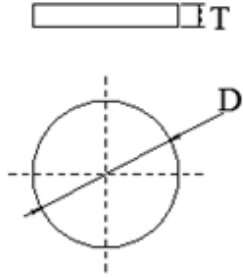


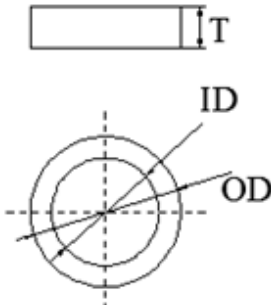
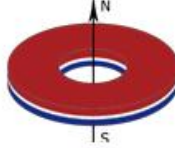
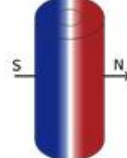

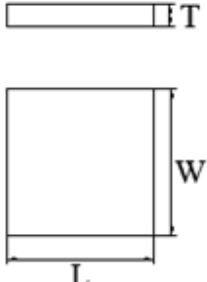
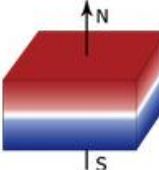
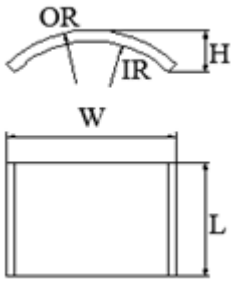
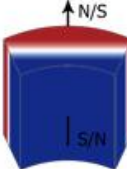
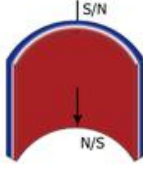
Note:

\* The data in the above table were samples' results tested at the temperature of 20 °C.

\* The temperature coefficients of  $B_r$  and  $H_{cj}$  are  $\alpha(B_r)$ : -0.09~-0.12 %/°C and  $\beta(H_{cj})$ : -0.40~-0.60 %/°C, respectively.

\* The above data are only for reference, magnets can be tailored according to customers' personalized requirements.

**Table II Sintered NdFeB Magnets' Shapes, Magnetization Direction and Size Range**

| Shape                 | Graphic Description   | Magnetization Direction   |                          | Size Range  |
|-----------------------|---|---|--------------------------|---|
| Disc/Cylinder         |    |    | Axially Magnetized       | D: 1-100 mm<br>T: 0.3-100 mm                                  |
|                       |   |    | Diametrically Magnetized | D: 1-100 mm<br>T: 0.3-100 mm                                  |
| Ring                  |   |    | Axially Magnetized       | OD: 1.5-100 mm<br>ID: 0.5-90 mm<br>T: 0.5-60 mm               |
|                       |   |   | Diametrically Magnetized | OD: 1.5-100 mm<br>ID: 0.5-90 mm<br>T: 0.5-60 mm               |
|                       |   |  | Radially Magnetized      | OD: 20-200 mm<br>ID: 10-180 mm<br>T: 0.5-60 mm                |
| Block/<br>Rectangular |  |  | Thickness Magnetized     | L: 1-160 mm<br>W: 0.5-100 mm<br>T: 0.3-100 mm                 |
| Arc/Segment           |  |  | Diametrically Magnetized | OD-ID $\geq$ 1 mm<br>L: 1-160 mm<br>W: 3-100 mm<br>H: 1-80 mm |
|                       |   |  | Radially Magnetized      | OD-ID $\geq$ 1 mm<br>L: 1-80 mm<br>W: 3-40 mm<br>H: 1-10 mm   |

Note:

\* Other shapes of sintered NdFeB magnets can also be tailored according to customers' specific requirements.

**Table III Sintered NdFeB Magnets' Coating Types**

| Coating                       | Thickness ( $\mu\text{m}$ ) | SST (hr) | PCT (hr) | $T_w$ ( $^{\circ}\text{C}$ ) |
|-------------------------------|-----------------------------|----------|----------|------------------------------|
| Zn (Zinc)                     | 5-15                        | >24      | -        | $\leq 160$                   |
| C-Zn (Colored Zinc)           | 5-15                        | >48      | -        | $\leq 160$                   |
| Electroless Nickel            | 10-30                       | >96      | >72      | $\leq 230$                   |
| NiCuNi (Nickel Copper Nickel) | 10-20                       | >48      | >48      | $\leq 230$                   |
| NiCu + Black Nickel           | 10-20                       | >48      | >72      | $\leq 230$                   |
| NiCuNi + Tin                  | 10-25                       | >48      | >48      | $\leq 160$                   |
| NiCuNi + Gold                 | 10-25                       | >48      | >48      | $\leq 230$                   |
| NiCuNi + Silver               | 10-25                       | >48      | >48      | $\leq 160$                   |
| Epoxy                         | 10-30                       | >72      | >48      | $\leq 160$                   |
| Teflon                        | 10-20                       | >48      | -        | $\leq 230$                   |
| Everlube                      | 10-20                       | >96      | >72      | $\leq 230$                   |
| Parylene                      | 0.2-5                       | >96      | -        | $\leq 230$                   |

Note:

\* Salt spray test (SST) was conducted at 35  $^{\circ}\text{C}$  with 5% NaCl solution.

\* Pressure cooker test (PCT) was conducted at 120  $^{\circ}\text{C}$ , 2 atm and 100% RH.

**Table IV Some Physical Properties of Sintered NdFeB Magnets**

| Parameter  | Unit                               | Value     |
|--|------------------------------------|-----------|
| Density ( $\rho$ )   | $\text{g/cm}^3$                    | 7.4-7.7   |
| Curie Temperature ( $T_c$ )                                    | $^{\circ}\text{C}$                 | 310-370   |
| Recoil Permeability ( $\mu_{\text{rec}}$ )                     | -                                  | 1.05      |
| Vickers Hardness (HV)  | MPa                                | 500-600   |
| Bending Strength ( $\sigma_{\text{bb}}$ )                      | MPa                                | 200-400   |
| Compressive Strength ( $\sigma_{\text{bc}}$ )                  | MPa                                | 1000-1100 |
| Tensile Strength ( $\sigma_{\text{b}}$ )                       | MPa                                | 80-90     |
| Resistivity ( $\rho$ )   | $\mu\Omega\cdot\text{m}$           | 1.4-1.6   |
| Thermal Conductivity ( $\lambda$ )                             | $\text{W}/(\text{m}\cdot\text{K})$ | 8-10      |
| Young's Modulus (E)  | GPa                                | 150-200   |
| Thermal Expansivity // Magnetization ( $\alpha_{//}$ )         | $10^{-6}/^{\circ}\text{C}$         | 3-4       |
| Thermal Expansivity $\perp$ Magnetization ( $\alpha_{\perp}$ ) | $10^{-6}/^{\circ}\text{C}$         | 1-3       |

Note:

\* The above data are only for reference, specific magnets maybe have different values.