

**BB AUTOMACAO**  
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## **BB Automacao NdFeB Magnets**

### **Neodymium Iron Boron magnets**

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Rare earth permanent magnet NdFeB is a new kind of magnetic material developed in the 1980's with excellent magnetic characteristics (high energy product and high coercive force etc.) and relatively low cost. It is getting to replace the traditional magnets of hard ferrite, AlNiCo and SmCo in many fields such as electro-acoustic devices, electric motors, sensors/transducers, instruments and meters, auto industry, petro-chemical industry and magnetic health-care products etc.

### Material Information

- Produced by powder metallurgical method with chemical composition of  $Nd_2Fe_{14}B$
- High resistance to demagnetization
- High magnetic values ( $Br$ ,  $bH_c$ ,  $iH_c$  und  $(BH)_{max}$ )
- Excellent cost to performance ratio
- Reasonable temperature stability
- Very brittle & hard
- Poorest corrosion resistance of all commercial magnetic materials
- Not suitable for application which exposed in high temperature conditions

### Typical Physical Properties

|  |                   |
|--|-------------------|
| Curie Temperature (°C)                       | 310-370           |
| Maximum Operating Temperature (°C)           | 80-240            |
| Resistivity ( $\mu \Omega.cm$ )              | 160               |
| Hardness (Hv)                                | 560-580           |
| Density ( $g/cm^3$ )                         | 7.40              |
| Relative Recoil Permeability ( $\mu_{rec}$ ) | 1.05              |
| Saturation Field Strength, kOe (kA/m)        | 30-40 (2400-3200) |
| Temperature Coefficient of $Br$ (%/°C)       | -0.12 ~ -0.10     |
| Temperature Coefficient of $iH_c$ (%/°C)     | -0.6              |

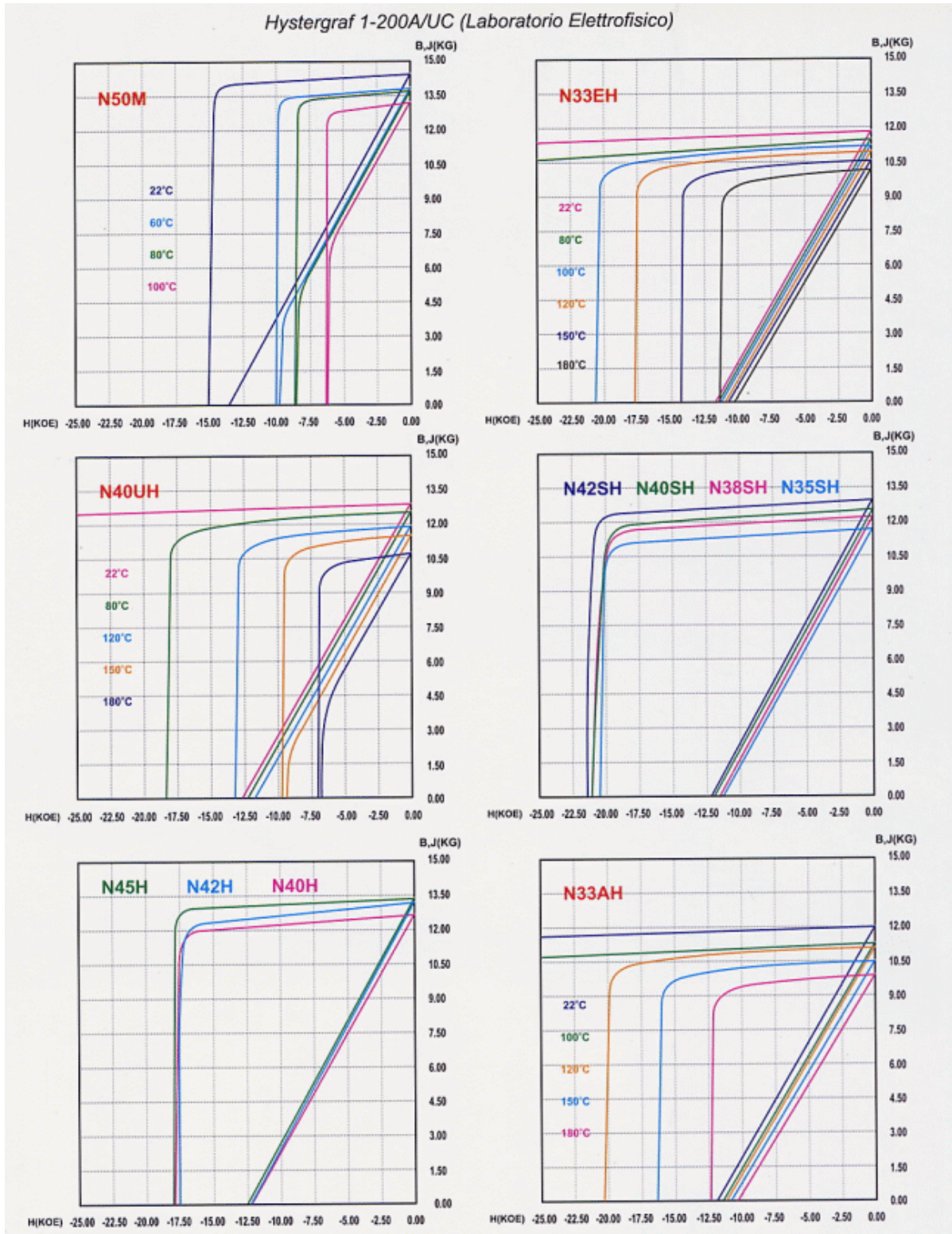
### Surface Treatments

| Type      | Information   |
|-----------|---|
| Metallic  | Zinc, Nickel, Nickel + Nickel, Nickel + Tin, Nickel + Copper + Nickel, Gold |
| Organic   | Epoxy, Nickel + Epoxy coating   |
| Temporary | Surface Passivation   |

## Magnetic Properties of Sintered NdFeB Magnets

| Material Grade | Max. working Temp. (°C) | Remanence |      |         |      | Coercivity |      |          |      | Intr. Coercivity |           | Max. Energy Product                      |     |                            |     |
|----------------|-------------------------|-----------|------|---------|------|------------|------|----------|------|------------------|-----------|--|-----|----------------------------|-----|
|                |                         | Br(T)     |      | Br(kGs) |      | bHc(kA/m)  |      | bHc(kOe) |      | iHc (kA/m)       | iHc (kOe) | (BH) <sub>max</sub> (KJ/m <sup>3</sup> ) |     | (BH) <sub>max</sub> (MGOe) |     |
|                |                         | Nom       | Min  | Nom     | Min  | Nom        | Min  | Nom      | Min  |                  |           | Nom                                      | Min | Nom                        | Min |
| N30            | 80                      | 1.12      | 1.08 | 11.2    | 10.8 | 836        | 780  | 10.5     | 9.8  | 955              | 12        | 239                                      | 223 | 30                         | 28  |
| N33            |                         | 1.17      | 1.14 | 11.7    | 11.4 | 876        | 820  | 11.0     | 10.3 | 955              | 12        | 263                                      | 247 | 33                         | 31  |
| N35            |                         | 1.21      | 1.17 | 12.1    | 11.7 | 915        | 860  | 11.5     | 10.8 | 955              | 12        | 279                                      | 263 | 35                         | 33  |
| N38            |                         | 1.26      | 1.22 | 12.6    | 12.2 | 915        | 860  | 11.5     | 10.8 | 955              | 12        | 303                                      | 287 | 38                         | 36  |
| N40            |                         | 1.29      | 1.26 | 12.9    | 12.6 | 876        | 836  | 11.0     | 10.5 | 955              | 12        | 318                                      | 303 | 40                         | 38  |
| N42            |                         | 1.30      | 1.27 | 13.0    | 12.7 | 876        | 836  | 11.0     | 10.5 | 955              | 12        | 334                                      | 318 | 42                         | 40  |
| N45            |                         | 1.38      | 1.32 | 13.8    | 13.2 | 924        | 876  | 11.6     | 11.0 | 955              | 12        | 366                                      | 342 | 46                         | 43  |
| N48            |                         | 1.42      | 1.38 | 14.2    | 13.8 | 890        | 835  | 11.19    | 10.5 | 876              | 11        | 390                                      | 366 | 49                         | 46  |
| N50            |                         | 1.47      | 1.41 | 14.7    | 14.1 | 1035       | 829  | 13.0     | 10.5 | 876              | 11        | 414                                      | 382 | 52                         | 48  |
| N30M           | 100                     | 1.12      | 1.08 | 11.2    | 10.8 | 836        | 780  | 10.5     | 9.8  | 1114             | 14        | 239                                      | 223 | 30                         | 28  |
| N33M           |                         | 1.17      | 1.14 | 11.7    | 11.4 | 876        | 820  | 11.0     | 10.3 | 1114             | 14        | 263                                      | 247 | 33                         | 31  |
| N35M           |                         | 1.21      | 1.17 | 12.1    | 11.7 | 915        | 860  | 11.5     | 10.8 | 1114             | 14        | 279                                      | 263 | 35                         | 33  |
| N38M           |                         | 1.26      | 1.22 | 12.6    | 12.2 | 915        | 860  | 11.5     | 10.8 | 1114             | 14        | 303                                      | 287 | 38                         | 36  |
| N40M           |                         | 1.29      | 1.26 | 12.9    | 12.6 | 915        | 860  | 11.5     | 10.8 | 1114             | 14        | 318                                      | 303 | 40                         | 38  |
| N42M           |                         | 1.32      | 1.28 | 13.2    | 12.8 | 1010       | 955  | 12.7     | 12.0 | 1114             | 14        | 342                                      | 318 | 44                         | 40  |
| N45M           |                         | 1.38      | 1.32 | 13.8    | 13.2 | 1050       | 994  | 13.2     | 12.5 | 1114             | 14        | 366                                      | 334 | 46                         | 42  |
| N48M           |                         | 1.43      | 1.37 | 14.3    | 13.7 | 1090       | 1035 | 13.7     | 13.0 | 1120             | 14        | 392                                      | 360 | 49                         | 45  |
| N50M           |                         | 1.47      | 1.41 | 14.7    | 14.1 | 1138       | 1043 | 14.3     | 13.1 | 1114             | 14        | 414                                      | 382 | 52                         | 48  |
| N27H           | 120                     | 1.06      | 1.02 | 10.6    | 10.2 | 796        | 740  | 10.0     | 9.3  | 1353             | 17        | 215                                      | 199 | 27                         | 25  |
| N30H           |                         | 1.12      | 1.08 | 11.2    | 10.8 | 836        | 780  | 10.5     | 9.8  | 1353             | 17        | 239                                      | 223 | 30                         | 28  |
| N33H           |                         | 1.17      | 1.14 | 11.7    | 11.4 | 876        | 820  | 11.0     | 10.3 | 1353             | 17        | 263                                      | 247 | 33                         | 31  |
| N35H           |                         | 1.21      | 1.17 | 12.1    | 11.7 | 915        | 860  | 11.5     | 10.8 | 1353             | 17        | 279                                      | 263 | 35                         | 33  |
| N38H           |                         | 1.26      | 1.22 | 12.6    | 12.2 | 955        | 915  | 12.0     | 11.5 | 1353             | 17        | 303                                      | 287 | 38                         | 36  |
| N40H           |                         | 1.28      | 1.24 | 12.8    | 12.4 | 955        | 915  | 12.0     | 11.5 | 1353             | 17        | 334                                      | 311 | 42                         | 39  |
| N42H           |                         | 1.32      | 1.28 | 13.2    | 12.8 | 1010       | 955  | 12.7     | 12.0 | 1353             | 17        | 342                                      | 318 | 43                         | 40  |
| N45H           |                         | 1.36      | 1.32 | 13.6    | 13.2 | 1050       | 1000 | 13.2     | 12.5 | 1360             | 17        | 376                                      | 344 | 47                         | 43  |
| N27SH          | 150                     | 1.06      | 1.02 | 10.6    | 10.2 | 796        | 740  | 10.0     | 9.3  | 1595             | 20        | 215                                      | 199 | 27                         | 25  |
| N30SH          |                         | 1.12      | 1.08 | 11.2    | 10.8 | 836        | 780  | 10.5     | 9.8  | 1595             | 20        | 239                                      | 223 | 30                         | 28  |
| N33SH          |                         | 1.17      | 1.14 | 11.7    | 11.4 | 876        | 820  | 11.0     | 10.3 | 1595             | 20        | 263                                      | 247 | 33                         | 31  |
| N35SH          |                         | 1.21      | 1.17 | 12.1    | 11.7 | 915        | 860  | 11.5     | 10.8 | 1595             | 20        | 279                                      | 263 | 35                         | 33  |
| N38SH          |                         | 1.26      | 1.22 | 12.6    | 12.2 | 924        | 870  | 11.6     | 10.9 | 1595             | 20        | 311                                      | 286 | 39                         | 36  |
| N40SH          |                         | 1.28      | 1.24 | 12.8    | 12.4 | 989        | 939  | 12.4     | 11.8 | 1592             | 20        | 326                                      | 302 | 41                         | 38  |
| N42SH          |                         | 1.35      | 1.30 | 13.5    | 13.0 | 1013       | 963  | 12.7     | 12.0 | 1600             | 20        | 344                                      | 312 | 43                         | 39  |
| N44SH          |                         | 1.37      | 1.32 | 13.7    | 13.2 | ≥963       |      | ≥12.1    |      | 1600             | 20        | 358                                      | 326 | 45                         | 41  |
| N25UH          | 180                     | 1.02      | 0.98 | 10.2    | 9.8  | 764        | 732  | 9.6      | 9.2  | 1990             | 25        | 199                                      | 183 | 25                         | 23  |
| N28UH          |                         | 1.08      | 1.04 | 10.8    | 10.4 | 812        | 780  | 10.2     | 9.8  | 1990             | 25        | 223                                      | 207 | 28                         | 26  |
| N30UH          |                         | 1.10      | 1.08 | 11.0    | 10.8 | 812        | 780  | 10.2     | 9.8  | 1990             | 25        | 247                                      | 223 | 31                         | 28  |
| N33UH          |                         | 1.17      | 1.13 | 11.7    | 11.3 | 836        | 804  | 10.5     | 10.1 | 1990             | 25        | 270                                      | 247 | 34                         | 31  |
| N35UH          |                         | 1.22      | 1.17 | 12.2    | 11.7 | 891        | 836  | 11.2     | 10.5 | 1990             | 25        | 279                                      | 263 | 35                         | 33  |
| N38UH          |                         | 1.29      | 1.21 | 12.9    | 12.1 | ≥915       |      | ≥11.6    |      | 1990             | 25        | 318                                      | 287 | 40                         | 36  |
| N40UH          |                         | 1.32      | 1.25 | 13.2    | 12.5 | ≥836       |      | ≥10.5    |      | 1990             | 25        | 334                                      | 303 | 42                         | 38  |
| N27EH          | 200                     | 1.08      | 1.02 | 10.8    | 10.2 | 784        | 752  | 9.8      | 9.4  | 2388             | 30        | 223                                      | 191 | 28                         | 25  |
| N28EH          |                         | 1.09      | 1.04 | 10.9    | 10.4 | 825        | 780  | 10.4     | 9.8  | 2388             | 30        | 231                                      | 207 | 29                         | 26  |
| N30EH          |                         | 1.13      | 1.08 | 11.3    | 10.8 | 804        | 772  | 10.1     | 9.7  | 2388             | 30        | 247                                      | 223 | 31                         | 28  |
| N33EH          |                         | 1.18      | 1.14 | 11.8    | 11.4 | 885        | 835  | 11.1     | 10.5 | 2388             | 30        | 272                                      | 248 | 34                         | 31  |
| N35EH          |                         | 1.25      | 1.18 | 12.5    | 11.8 | ≥875       |      | ≥11.0    |      | 2388             | 30        | 295                                      | 263 | 37                         | 33  |
| N28AH          | 240                     | 1.08      | 1.04 | 10.8    | 10.4 | 828        | 796  | 10.4     | 10.0 | 2785             | 35        | 223                                      | 207 | 28                         | 26  |
| N30AH          |                         | 1.12      | 1.08 | 11.2    | 10.8 | 851        | 828  | 10.7     | 10.4 | 2785             | 35        | 239                                      | 223 | 30                         | 28  |
| N33AH          |                         | 1.17      | 1.14 | 11.7    | 11.4 | 891        | 867  | 11.2     | 10.9 | 2785             | 35        | 263                                      | 247 | 33                         | 31  |
| N35AH          |                         | 1.21      | 1.17 | 12.1    | 11.7 | 915        | 860  | 11.5     | 10.8 | 2785             | 35        | 271                                      | 247 | 34                         | 31  |

# Typical Demagnetization Curves of NdFeB Magnets



## Dimension Range / Nominal Tolerance

| Ring Magnet | Outer Diameter (mm) | Inner Diameter (mm) | Thickness (mm) |
|-------------|---------------------|---------------------|----------------|
| Maximum     | 200                 | 180                 | 50             |
| Minimum     | 2.6                 | 1.8                 | 0.5            |
| Tolerance   | ±0.1                | ±0.1                | ±0.1           |

| Block Magnet | Length (mm) | Width (mm) | Thickness (mm) |
|--------------|-------------|------------|----------------|
| Maximum      | 200         | 80         | 50             |
| Minimum      | 2.0         | 1.5        | 0.5            |
| Tolerance    | ±0.1        | ±0.1       | ±0.1           |

| Disc Magnet | Diameter (mm) | Thickness (mm) |
|-------------|---------------|----------------|
| Maximum     | 200           | 50             |
| Minimum     | 1.2           | 0.5            |
| Tolerance   | ±0.1          | ±0.1           |

Segment & other irregular shapes can be manufactured according to customer's sample or blue print

BB Automacao supplies various kinds of sintered NdFeB magnets in specific sizes and shapes according to the customers' requirements. It allows also its customers to customize characteristics of their magnets. The shapes can be discs, rings, blocks, slabs, cylinders, ball, tiles and other specific shapes.



## Price Lists of Sintered NdFeB Magnets

The following tables show some available standard block, Disc and Ring magnets. The prices are listed for the material grade N38. We will quote you the prices for any other material grade when you could send us your inquiries per email or fax.

### NdFeB Block magnets

Standard magnetization: height (H) direction  
Possible magnetization: length (L) and width (W) direction

| Ref. No.  | Dimensions(mm)<br>L x W x H | Material<br>Grade | Unit Price (EUR/pc) |           |            |          |
|-----------|-----------------------------|-------------------|---------------------|-----------|------------|----------|
|           |                             |                   | 5-49pcs             | 50-199pcs | 200-999pcs | 1k-2kpcs |
| M1B17-001 | 3 x 2 x 2                   | N38               | 0.09                | 0.07      | 0.06       | 0.05     |
| M1B17-002 | 3 x 3 x 2                   | N38               | 0.09                | 0.07      | 0.06       | 0.05     |
| M1B17-003 | 4 x 1 x 1                   | N38               | 0.09                | 0.07      | 0.06       | 0.05     |
| M1B17-004 | 4 x 2 x 1.5                 | N38               | 0.09                | 0.07      | 0.06       | 0.05     |
| M1B17-005 | 4 x 2 x 2                   | N38               | 0.09                | 0.07      | 0.06       | 0.05     |
| M1B17-006 | 4 x 3 x 1                   | N38               | 0.09                | 0.07      | 0.06       | 0.05     |
| M1B17-007 | 4 x 3 x 2                   | N38               | 0.09                | 0.07      | 0.06       | 0.05     |
| M1B17-008 | 5 x 2 x 2                   | N38               | 0.09                | 0.07      | 0.06       | 0.05     |
| M1B17-009 | 5 x 3 x 2                   | N38               | 0.10                | 0.09      | 0.07       | 0.06     |
| M1B17-010 | 5 x 4 x 1                   | N38               | 0.09                | 0.07      | 0.06       | 0.05     |
| M1B17-011 | 5 x 4 x 1.5                 | N38               | 0.10                | 0.08      | 0.07       | 0.06     |
| M1B17-012 | 5 x 4 x 2                   | N38               | 0.11                | 0.09      | 0.08       | 0.06     |
| M1B17-013 | 5 x 5 x 1.5                 | N38               | 0.11                | 0.09      | 0.08       | 0.06     |
| M1B17-014 | 5 x 5 x 2                   | N38               | 0.11                | 0.10      | 0.08       | 0.07     |
| M1B17-015 | 5 x 5 x 3                   | N38               | 0.15                | 0.12      | 0.10       | 0.08     |
| M1B17-016 | 6 x 2 x 2                   | N38               | 0.09                | 0.07      | 0.06       | 0.05     |
| M1B17-017 | 6 x 3 x 2                   | N38               | 0.11                | 0.09      | 0.08       | 0.06     |
| M1B17-018 | 6 x 4 x 2                   | N38               | 0.10                | 0.09      | 0.07       | 0.06     |
| M1B17-019 | 6 x 5 x 2                   | N38               | 0.12                | 0.10      | 0.09       | 0.07     |
| M1B17-020 | 7 x 3 x 2                   | N38               | 0.10                | 0.09      | 0.07       | 0.06     |
| M1B17-021 | 7 x 5 x 2                   | N38               | 0.14                | 0.12      | 0.10       | 0.08     |
| M1B17-022 | 7 x 6 x 2                   | N38               | 0.16                | 0.13      | 0.11       | 0.09     |
| M1B17-023 | 8 x 2 x 2                   | N38               | 0.11                | 0.09      | 0.08       | 0.06     |
| M1B17-024 | 8 x 4 x 2                   | N38               | 0.13                | 0.11      | 0.09       | 0.08     |
| M1B17-025 | 8 x 5 x 2                   | N38               | 0.15                | 0.13      | 0.11       | 0.09     |
| M1B17-026 | 8 x 8 x 2                   | N38               | 0.24                | 0.20      | 0.17       | 0.14     |
| M1B17-027 | 10 x 4 x 1.5                | N38               | 0.14                | 0.12      | 0.10       | 0.08     |
| M1B17-028 | 10 x 4 x 2                  | N38               | 0.16                | 0.13      | 0.11       | 0.09     |
| M1B17-029 | 10 x 5 x 2                  | N38               | 0.19                | 0.16      | 0.13       | 0.11     |
| M1B17-030 | 10 x 5 x 3                  | N38               | 0.25                | 0.21      | 0.17       | 0.15     |
| M1B17-031 | 10 x 5 x 4                  | N38               | 0.32                | 0.27      | 0.22       | 0.19     |
| M1B17-032 | 10 x 6 x 5                  | N38               | 0.44                | 0.37      | 0.31       | 0.26     |
| M1B17-033 | 10 x 10 x 10                | N38               | 1.24                | 1.04      | 0.86       | 0.72     |

| Ref. No.  | Dimensions(mm)<br>L x W x H | Material<br>Grade | Unit Price (EUR/pc) |           |            |          |
|-----------|-----------------------------|-------------------|---------------------|-----------|------------|----------|
|           |                             |                   | 5-49pcs             | 50-199pcs | 200-999pcs | 1k-2kpcs |
| M1B17-034 | 12 x 4 x 2                  | N38               | 0.19                | 0.16      | 0.13       | 0.11     |
| M1B17-035 | 12 x 6 x 2.5                | N38               | 0.31                | 0.26      | 0.22       | 0.18     |
| M1B17-036 | 12 x 8 x 3                  | N38               | 0.40                | 0.35      | 0.30       | 0.26     |
| M1B17-037 | 12 x 10 x 5                 | N38               | 0.71                | 0.61      | 0.53       | 0.46     |
| M1B17-038 | 15 x 5 x 2                  | N38               | 0.25                | 0.21      | 0.19       | 0.16     |
| M1B17-039 | 15 x 8 x 2                  | N38               | 0.38                | 0.33      | 0.29       | 0.25     |
| M1B17-040 | 15 x 8 x 4                  | N38               | 0.61                | 0.53      | 0.46       | 0.40     |
| M1B17-041 | 15 x 10 x 2                 | N38               | 0.46                | 0.40      | 0.35       | 0.30     |
| M1B17-042 | 15 x 10 x 4                 | N38               | 0.73                | 0.64      | 0.55       | 0.48     |
| M1B17-043 | 15 x 10 x 5                 | N38               | 0.87                | 0.76      | 0.66       | 0.57     |
| M1B17-044 | 20 x 5 x 2                  | N38               | 0.29                | 0.25      | 0.22       | 0.19     |
| M1B17-045 | 20 x 5 x 4                  | N38               | 0.47                | 0.41      | 0.35       | 0.31     |
| M1B17-046 | 20 x 10 x 2                 | N38               | 0.53                | 0.46      | 0.40       | 0.35     |
| M1B17-047 | 20 x 10 x 5                 | N38               | 1.01                | 0.87      | 0.75       | 0.65     |
| M1B17-048 | 20 x 15 x 5                 | N38               | 1.46                | 1.26      | 1.09       | 0.95     |
| M1B17-049 | 20 x 15 x 10                | N38               | 2.65                | 2.28      | 1.97       | 1.71     |
| M1B17-050 | 20 x 20 x 20                | N38               | 6.70                | 5.78      | 4.98       | 4.33     |
| M1B17-051 | 25 x 5 x 2                  | N38               | 0.36                | 0.31      | 0.26       | 0.23     |
| M1B17-052 | 25 x 5 x 4                  | N38               | 0.58                | 0.50      | 0.43       | 0.38     |
| M1B17-053 | 25 x 10 x 4                 | N38               | 1.05                | 0.91      | 0.78       | 0.68     |
| M1B17-054 | 25 x 10 x 8                 | N38               | 1.87                | 1.61      | 1.39       | 1.21     |
| M1B17-055 | 25 x 10 x 10                | N38               | 2.24                | 1.93      | 1.67       | 1.45     |
| M1B17-056 | 25 x 12 x 3                 | N38               | 1.01                | 0.87      | 0.75       | 0.65     |
| M1B17-057 | 25 x 15 x 2                 | N38               | 0.96                | 0.83      | 0.71       | 0.62     |
| M1B17-058 | 25 x 15 x 5                 | N38               | 1.83                | 1.57      | 1.36       | 1.18     |
| M1B17-059 | 25 x 20 x 8                 | N38               | 3.55                | 3.06      | 2.64       | 2.30     |
| M1B17-060 | 30 x 5 x 2                  | N38               | 0.43                | 0.37      | 0.32       | 0.28     |
| M1B17-061 | 30 x 8 x 5                  | N38               | 1.23                | 1.06      | 0.91       | 0.80     |
| M1B17-062 | 30 x 10 x 4                 | N38               | 1.28                | 1.10      | 0.95       | 0.83     |
| M1B17-063 | 30 x 10 x 5                 | N38               | 1.51                | 1.30      | 1.12       | 0.98     |
| M1B17-064 | 30 x 12 x 4                 | N38               | 1.55                | 1.33      | 1.15       | 1.00     |
| M1B17-065 | 30 x 12 x 6                 | N38               | 2.10                | 1.81      | 1.56       | 1.36     |
| M1B17-066 | 30 x 15 x 5                 | N38               | 2.19                | 1.89      | 1.63       | 1.42     |
| M1B17-067 | 30 x 15 x 8                 | N38               | 3.23                | 2.79      | 2.40       | 2.09     |
| M1B17-068 | 30 x 20 x 5                 | N38               | 2.92                | 2.51      | 2.17       | 1.89     |
| M1B17-069 | 30 x 20 x 10                | N38               | 5.15                | 4.44      | 3.82       | 3.33     |
| M1B17-070 | 30 x 25 x 5                 | N38               | 3.55                | 3.06      | 2.64       | 2.30     |
| M1B17-071 | 35 x 5 x 2                  | N38               | 0.49                | 0.42      | 0.36       | 0.32     |
| M1B17-072 | 35 x 8 x 2                  | N38               | 0.77                | 0.67      | 0.58       | 0.50     |
| M1B17-073 | 35 x 10 x 2                 | N38               | 0.91                | 0.79      | 0.68       | 0.59     |
| M1B17-074 | 35 x 15 x 4                 | N38               | 2.19                | 1.89      | 1.63       | 1.42     |
| M1B17-075 | 35 x 20 x 5                 | N38               | 3.37                | 2.91      | 2.51       | 2.18     |
| M1B17-076 | 40 x 5 x 2                  | N38               | 0.56                | 0.48      | 0.41       | 0.36     |
| M1B17-077 | 40 x 10 x 4                 | N38               | 1.69                | 1.45      | 1.25       | 1.09     |
| M1B17-078 | 40 x 10 x 5                 | N38               | 1.97                | 1.70      | 1.47       | 1.28     |

| Ref. No.  | Dimensions(mm)<br>L x W x H | Material<br>Grade | Unit Price (EUR/pc) |           |            |          |
|-----------|-----------------------------|-------------------|---------------------|-----------|------------|----------|
|           |                             |                   | 5-49pcs             | 50-199pcs | 200-999pcs | 1k-2kpcs |
| M1B17-079 | 40 x 15 x 5                 | N38               | 2.87                | 2.47      | 2.13       | 1.86     |
| M1B17-080 | 40 x 15 x 8                 | N38               | 4.19                | 3.62      | 3.12       | 2.71     |
| M1B17-081 | 40 x 25 x 5                 | N38               | 4.64                | 4.00      | 3.45       | 3.00     |
| M1B17-082 | 40 x 20 x 8                 | N38               | 5.56                | 4.79      | 4.13       | 3.59     |
| M1B17-083 | 50 x 10 x 5                 | N38               | 2.46                | 2.12      | 1.84       | 1.60     |
| M1B17-084 | 50 x 15 x 5                 | N38               | 3.55                | 3.06      | 2.66       | 2.31     |
| M1B17-085 | 50 x 20 x 5                 | N38               | 4.69                | 4.04      | 3.51       | 3.06     |
| M1B17-086 | 50 x 30 x 5                 | N38               | 6.92                | 5.97      | 5.19       | 4.51     |
| M1B17-087 | 60 x 10 x 2                 | N38               | 1.69                | 1.45      | 1.26       | 1.10     |
| M1B17-088 | 60 x 15 x 4                 | N38               | 3.60                | 3.10      | 2.70       | 2.35     |
| M1B17-089 | 60 x 20 x 5                 | N38               | 5.60                | 4.83      | 4.20       | 3.65     |
| M1B17-090 | 70 x 10 x 3                 | N38               | 3.19                | 2.75      | 2.39       | 2.08     |
| M1B17-091 | 70 x 15 x 4                 | N38               | 5.38                | 4.64      | 4.03       | 3.51     |
| M1B17-092 | 75 x 20 x 5                 | N38               | 8.56                | 7.38      | 6.41       | 5.58     |
| M1B17-093 | 75 x 25 x 5                 | N38               | 10.38               | 8.95      | 7.78       | 6.77     |
| M1B17-094 | 75 x 40 x 5                 | N38               | 16.29               | 14.05     | 12.21      | 10.62    |
| M1B17-095 | 80 x 10 x 4                 | N38               | 4.33                | 3.73      | 3.24       | 2.82     |
| M1B17-096 | 80 x 20 x 5                 | N38               | 9.11                | 7.85      | 6.83       | 5.94     |
| M1B17-097 | 90 x 15 x 5                 | N38               | 7.88                | 6.79      | 5.90       | 5.13     |
| M1B17-098 | 90 x 25 x 5                 | N38               | 12.66               | 10.91     | 9.49       | 8.25     |
| M1B17-099 | 100 x 20 x 5                | N38               | 11.84               | 10.21     | 8.87       | 7.72     |
| M1B17-100 | 100 x 45 x 5                | N38               | 25.13               | 21.66     | 18.84      | 16.38    |

The prices are FOB prices Munich/Germany and not inclusive freight fee

**Minimum order in value: EURO 100.00**

## NdFeB Disc and Cylinder Magnets

Standard magnetization: height (H) direction  
Possible magnetization: diameter (D) direction

| Ref. No.  | Dimensions (mm)<br>Ø D × H | Material<br>Grade | Unit Price (EUR/pc) |           |            |          |
|-----------|----------------------------|-------------------|---------------------|-----------|------------|----------|
|           |                            |                   | 5-49pcs             | 50-199pcs | 200-999pcs | 1k-2kpcs |
| M1D17-001 | Ø 1.5 x 2                  | N38               | 0.09                | 0.08      | 0.06       | 0.05     |
| M1D17-002 | Ø 1.5 x 3                  | N38               | 0.09                | 0.08      | 0.06       | 0.05     |
| M1D17-003 | Ø 1.5 x 5                  | N38               | 0.12                | 0.10      | 0.09       | 0.07     |
| M1D17-004 | Ø 1.5 x 10                 | N38               | 0.20                | 0.16      | 0.14       | 0.11     |
| M1D17-005 | Ø 2 x 1.5                  | N38               | 0.09                | 0.08      | 0.06       | 0.05     |
| M1D17-006 | Ø 2 x 2                    | N38               | 0.09                | 0.07      | 0.06       | 0.05     |
| M1D17-007 | Ø 2 x 3                    | N38               | 0.09                | 0.08      | 0.06       | 0.05     |
| M1D17-008 | Ø 2 x 4                    | N38               | 0.10                | 0.09      | 0.07       | 0.06     |
| M1D17-009 | Ø 2 x 5                    | N38               | 0.12                | 0.10      | 0.08       | 0.06     |
| M1D17-010 | Ø 2 x 10                   | N38               | 0.17                | 0.14      | 0.12       | 0.09     |
| M1D17-011 | Ø 3 x 1                    | N38               | 0.08                | 0.07      | 0.06       | 0.05     |
| M1D17-012 | Ø 3 x 2                    | N38               | 0.08                | 0.07      | 0.06       | 0.05     |
| M1D17-013 | Ø 3 x 4                    | N38               | 0.11                | 0.09      | 0.08       | 0.06     |
| M1D17-014 | Ø 3 x 5                    | N38               | 0.11                | 0.10      | 0.08       | 0.07     |
| M1D17-015 | Ø 3 x 8.5                  | N38               | 0.14                | 0.12      | 0.10       | 0.08     |
| M1D17-016 | Ø 3 x 10                   | N38               | 0.17                | 0.14      | 0.12       | 0.09     |
| M1D17-017 | Ø 3 x 15                   | N38               | 0.23                | 0.19      | 0.16       | 0.14     |
| M1D17-018 | Ø 4 x 2                    | N38               | 0.10                | 0.08      | 0.07       | 0.06     |
| M1D17-019 | Ø 4 x 5                    | N38               | 0.14                | 0.12      | 0.10       | 0.08     |
| M1D17-020 | Ø 4 x 8                    | N38               | 0.19                | 0.16      | 0.14       | 0.11     |
| M1D17-021 | Ø 4 x 10                   | N38               | 0.23                | 0.19      | 0.16       | 0.14     |
| M1D17-022 | Ø 4 x 15                   | N38               | 0.34                | 0.29      | 0.24       | 0.20     |
| M1D17-023 | Ø 4 x 20                   | N38               | 0.46                | 0.38      | 0.32       | 0.27     |
| M1D17-024 | Ø 4 x 30                   | N38               | 0.69                | 0.58      | 0.48       | 0.40     |
| M1D17-025 | Ø 5 x 2                    | N38               | 0.10                | 0.08      | 0.07       | 0.06     |
| M1D17-026 | Ø 5 x 5                    | N38               | 0.16                | 0.13      | 0.11       | 0.09     |
| M1D17-027 | Ø 5 x 10                   | N38               | 0.23                | 0.19      | 0.16       | 0.13     |
| M1D17-028 | Ø 5 x 15                   | N38               | 0.33                | 0.27      | 0.23       | 0.19     |
| M1D17-029 | Ø 5 x 20                   | N38               | 0.44                | 0.36      | 0.30       | 0.25     |
| M1D17-030 | Ø 5 x 25                   | N38               | 0.53                | 0.44      | 0.37       | 0.31     |
| M1D17-031 | Ø 5 x 30                   | N38               | 0.90                | 0.75      | 0.63       | 0.52     |
| M1D17-032 | Ø 6 x 2                    | N38               | 0.11                | 0.10      | 0.08       | 0.07     |
| M1D17-033 | Ø 6 x 4                    | N38               | 0.13                | 0.11      | 0.09       | 0.08     |
| M1D17-034 | Ø 6 x 5                    | N38               | 0.16                | 0.13      | 0.11       | 0.09     |
| M1D17-035 | Ø 6 x 10                   | N38               | 0.31                | 0.26      | 0.22       | 0.18     |
| M1D17-036 | Ø 6 x 20                   | N38               | 0.53                | 0.46      | 0.40       | 0.35     |
| M1D17-037 | Ø 6 x 30                   | N38               | 0.97                | 0.84      | 0.73       | 0.64     |
| M1D17-038 | Ø 7 x 2                    | N38               | 0.11                | 0.10      | 0.09       | 0.08     |
| M1D17-039 | Ø 7 x 5                    | N38               | 0.21                | 0.18      | 0.16       | 0.14     |
| M1D17-040 | Ø 7 x 10                   | N38               | 0.38                | 0.33      | 0.28       | 0.25     |

| Ref. No.  | Dimensions (mm)<br>Ø D × H | Material<br>Grade | Unit Price (EUR/pc) |           |            |          |
|-----------|----------------------------|-------------------|---------------------|-----------|------------|----------|
|           |                            |                   | 5-49pcs             | 50-199pcs | 200-999pcs | 1k-2kpcs |
| M1D17-041 | Ø 7 × 20                   | N38               | 0.76                | 0.66      | 0.57       | 0.50     |
| M1D17-042 | Ø 7 × 30                   | N38               | 1.09                | 0.95      | 0.83       | 0.72     |
| M1D17-043 | Ø 8 × 2                    | N38               | 0.14                | 0.12      | 0.11       | 0.09     |
| M1D17-044 | Ø 8 × 5                    | N38               | 0.27                | 0.23      | 0.20       | 0.18     |
| M1D17-045 | Ø 8 × 10                   | N38               | 0.49                | 0.43      | 0.37       | 0.32     |
| M1D17-046 | Ø 8 × 20                   | N38               | 0.94                | 0.81      | 0.70       | 0.61     |
| M1D17-047 | Ø 8 × 40                   | N38               | 2.65                | 2.28      | 1.97       | 1.71     |
| M1D17-048 | Ø 10 × 2                   | N38               | 0.19                | 0.16      | 0.14       | 0.12     |
| M1D17-049 | Ø 10 × 5                   | N38               | 0.36                | 0.31      | 0.26       | 0.23     |
| M1D17-050 | Ø 10 × 10                  | N38               | 0.71                | 0.62      | 0.53       | 0.46     |
| M1D17-051 | Ø 10 × 20                  | N38               | 1.40                | 1.21      | 1.04       | 0.91     |
| M1D17-052 | Ø 10 × 30                  | N38               | 2.01                | 1.73      | 1.49       | 1.30     |
| M1D17-053 | Ø 10 × 50                  | N38               | 3.51                | 3.02      | 2.61       | 2.27     |
| M1D17-054 | Ø 12 × 2                   | N38               | 0.29                | 0.25      | 0.22       | 0.19     |
| M1D17-055 | Ø 12 × 5                   | N38               | 0.56                | 0.48      | 0.42       | 0.36     |
| M1D17-056 | Ø 12 × 10                  | N38               | 1.00                | 0.87      | 0.75       | 0.65     |
| M1D17-057 | Ø 12 × 15                  | N38               | 1.51                | 1.30      | 1.12       | 0.97     |
| M1D17-058 | Ø 12 × 20                  | N38               | 2.01                | 1.73      | 1.49       | 1.30     |
| M1D17-059 | Ø 12 × 30                  | N38               | 2.86                | 2.47      | 2.13       | 1.85     |
| M1D17-060 | Ø 12 × 50                  | N38               | 4.91                | 4.23      | 3.65       | 3.17     |
| M1D17-061 | Ø 15 × 2                   | N38               | 0.43                | 0.37      | 0.32       | 0.28     |
| M1D17-062 | Ø 15 × 5                   | N38               | 0.84                | 0.73      | 0.63       | 0.55     |
| M1D17-063 | Ø 15 × 10                  | N38               | 1.52                | 1.31      | 1.13       | 0.98     |
| M1D17-064 | Ø 15 × 25                  | N38               | 3.56                | 3.07      | 2.64       | 2.30     |
| M1D17-065 | Ø 15 × 50                  | N38               | 7.15                | 6.17      | 5.32       | 4.62     |
| M1D17-066 | Ø 20 × 2                   | N38               | 0.74                | 0.64      | 0.55       | 0.48     |
| M1D17-067 | Ø 20 × 5                   | N38               | 1.42                | 1.22      | 1.05       | 0.92     |
| M1D17-068 | Ø 20 × 8                   | N38               | 2.14                | 1.85      | 1.59       | 1.39     |
| M1D17-069 | Ø 20 × 10                  | N38               | 2.55                | 2.20      | 1.90       | 1.65     |
| M1D17-070 | Ø 20 × 15                  | N38               | 3.74                | 3.22      | 2.78       | 2.42     |
| M1D17-071 | Ø 20 × 25                  | N38               | 6.01                | 5.18      | 4.47       | 3.89     |
| M1D17-072 | Ø 20 × 30                  | N38               | 7.06                | 6.08      | 5.24       | 4.56     |
| M1D17-073 | Ø 25 × 2                   | N38               | 1.18                | 1.02      | 0.88       | 0.77     |
| M1D17-074 | Ø 25 × 5                   | N38               | 2.19                | 1.89      | 1.63       | 1.42     |
| M1D17-075 | Ø 25 × 8                   | N38               | 3.28                | 2.83      | 2.44       | 2.12     |
| M1D17-076 | Ø 25 × 10                  | N38               | 3.96                | 3.42      | 2.94       | 2.56     |
| M1D17-077 | Ø 25 × 15                  | N38               | 5.74                | 4.95      | 4.27       | 3.71     |
| M1D17-078 | Ø 25 × 20                  | N38               | 7.61                | 6.56      | 5.65       | 4.92     |
| M1D17-079 | Ø 30 × 2                   | N38               | 1.69                | 1.45      | 1.25       | 1.09     |
| M1D17-080 | Ø 30 × 5                   | N38               | 3.14                | 2.71      | 2.33       | 2.03     |
| M1D17-081 | Ø 30 × 8                   | N38               | 4.69                | 4.04      | 3.48       | 3.03     |
| M1D17-082 | Ø 30 × 10                  | N38               | 5.65                | 4.87      | 4.20       | 3.65     |
| M1D17-083 | Ø 30 × 15                  | N38               | 8.19                | 7.06      | 6.14       | 5.34     |
| M1D17-084 | Ø 30 × 20                  | N38               | 10.92               | 9.42      | 8.19       | 7.12     |
| M1D17-085 | Ø 35 × 2                   | N38               | 2.24                | 1.93      | 1.68       | 1.46     |

| Ref. No.  | Dimensions (mm)<br>Ø D × H | Material<br>Grade | Unit Price (EUR/pc) |           |            |          |
|-----------|----------------------------|-------------------|---------------------|-----------|------------|----------|
|           |                            |                   | 5-49pcs             | 50-199pcs | 200-999pcs | 1k-2kpcs |
| M1D17-086 | Ø 35 × 5                   | N38               | 4.25                | 3.66      | 3.18       | 2.77     |
| M1D17-087 | Ø 35 × 10                  | N38               | 7.66                | 6.60      | 5.74       | 4.99     |
| M1D17-088 | Ø 40 × 2                   | N38               | 2.92                | 2.51      | 2.19       | 1.90     |
| M1D17-089 | Ø 40 × 5                   | N38               | 5.52                | 4.76      | 4.14       | 3.60     |
| M1D17-090 | Ø 40 × 8                   | N38               | 8.24                | 7.10      | 6.18       | 5.37     |
| M1D17-091 | Ø 45 × 2                   | N38               | 3.69                | 3.18      | 2.77       | 2.41     |
| M1D17-092 | Ø 45 × 5                   | N38               | 6.96                | 6.00      | 5.22       | 4.54     |
| M1D17-093 | Ø 45 × 8                   | N38               | 10.83               | 9.34      | 8.12       | 7.06     |
| M1D17-094 | Ø 50 × 2                   | N38               | 4.51                | 3.89      | 3.38       | 2.94     |
| M1D17-095 | Ø 50 × 3                   | N38               | 5.83                | 5.02      | 4.37       | 3.80     |
| M1D17-096 | Ø 50 × 5                   | N38               | 8.60                | 7.42      | 6.45       | 5.61     |
| M1D17-097 | Ø 70 × 2                   | N38               | 8.90                | 7.67      | 6.67       | 5.80     |
| M1D17-098 | Ø 70 × 5                   | N38               | 21.39               | 18.44     | 16.04      | 13.95    |
| M1D17-099 | Ø 75 × 3                   | N38               | 15.09               | 13.01     | 11.31      | 9.83     |
| M1D17-100 | Ø 75 × 5                   | N38               | 24.58               | 21.19     | 18.43      | 16.02    |

The prices are FOB prices Munich/Germany and not inclusive freight fee

**Minimum order in value: EURO 100.00**

## NdFeB Ring Magnets

Standard magnetization: height (H) direction  
Possible magnetization: diameter direction

| Ref. No.  | Dimensions (mm)<br>D <sub>o</sub> , D <sub>i</sub> × H | Material<br>Grade | Unit Price (EUR/pc) |           |            |          |
|-----------|--|-------------------|---------------------|-----------|------------|----------|
|           |  |                   | 5-49pcs             | 50-199pcs | 200-999pcs | 1k-2kpcs |
| M1R17-001 | Ø 5, ø 2 × 3   | N38               | 0.15                | 0.13      | 0.12       | 0.10     |
| M1R17-002 | Ø 6, ø 3 × 2   | N38               | 0.13                | 0.12      | 0.10       | 0.09     |
| M1R17-003 | Ø 8, ø 3 × 2   | N38               | 0.17                | 0.15      | 0.13       | 0.11     |
| M1R17-004 | Ø 8, ø 4 × 3   | N38               | 0.21                | 0.19      | 0.17       | 0.15     |
| M1R17-005 | Ø 8, ø 4 × 5   | N38               | 0.33                | 0.30      | 0.26       | 0.23     |
| M1R17-006 | Ø 8, ø 5 × 3   | N38               | 0.31                | 0.28      | 0.24       | 0.21     |
| M1R17-007 | Ø 8, ø 5 × 5   | N38               | 0.49                | 0.44      | 0.38       | 0.33     |
| M1R17-008 | Ø 10, ø 3 × 2  | N38               | 0.19                | 0.17      | 0.15       | 0.13     |
| M1R17-009 | Ø 10, ø 4 × 2  | N38               | 0.19                | 0.17      | 0.15       | 0.13     |
| M1R17-010 | Ø 10, ø 5 × 3  | N38               | 0.27                | 0.24      | 0.21       | 0.18     |
| M1R17-011 | Ø 10, ø 5 × 5  | N38               | 0.40                | 0.36      | 0.31       | 0.27     |
| M1R17-012 | Ø 10, ø 6 × 4  | N38               | 0.43                | 0.38      | 0.33       | 0.29     |
| M1R17-013 | Ø 15, ø 5 × 3  | N38               | 0.55                | 0.50      | 0.43       | 0.38     |
| M1R17-014 | Ø 15, ø 5 × 5  | N38               | 0.82                | 0.73      | 0.64       | 0.56     |
| M1R17-015 | Ø 15, ø 8 × 3  | N38               | 0.60                | 0.54      | 0.47       | 0.41     |
| M1R17-016 | Ø 15, ø 8 × 5  | N38               | 0.91                | 0.82      | 0.71       | 0.62     |
| M1R17-017 | Ø 15, ø 8 × 10   | N38               | 1.70                | 1.52      | 1.32       | 1.15     |
| M1R17-018 | Ø 18, ø 4 × 3  | N38               | 0.77                | 0.69      | 0.60       | 0.53     |
| M1R17-019 | Ø 18, ø 4 × 5  | N38               | 1.15                | 1.03      | 0.90       | 0.78     |
| M1R17-020 | Ø 18, ø 5 × 2  | N38               | 0.57                | 0.51      | 0.44       | 0.39     |
| M1R17-021 | Ø 18, ø 5 × 5  | N38               | 1.13                | 1.01      | 0.88       | 0.77     |
| M1R17-022 | Ø 18, ø 10 × 4   | N38               | 1.01                | 0.91      | 0.79       | 0.69     |
| M1R17-023 | Ø 20, ø 5 × 3  | N38               | 1.03                | 0.86      | 0.75       | 0.65     |
| M1R17-024 | Ø 20, ø 8 × 5  | N38               | 1.50                | 1.30      | 1.09       | 0.95     |
| M1R17-025 | Ø 20, ø 10 × 4   | N38               | 1.31                | 1.14      | 0.95       | 0.83     |
| M1R17-026 | Ø 20, ø 10 × 5   | N38               | 1.56                | 1.35      | 1.13       | 0.98     |
| M1R17-027 | Ø 20, ø 10 × 8   | N38               | 2.38                | 2.07      | 1.73       | 1.50     |
| M1R17-028 | Ø 25, ø 5 × 3  | N38               | 1.59                | 1.38      | 1.15       | 1.00     |
| M1R17-029 | Ø 25, ø 8 × 5  | N38               | 2.34                | 2.04      | 1.70       | 1.48     |
| M1R17-030 | Ø 25, ø 10 × 4   | N38               | 2.01                | 1.75      | 1.45       | 1.27     |
| M1R17-031 | Ø 25, ø 10 × 5   | N38               | 2.38                | 2.07      | 1.73       | 1.50     |
| M1R17-032 | Ø 25, ø 15 × 5   | N38               | 2.78                | 2.42      | 2.01       | 1.75     |
| M1R17-033 | Ø 25, ø 15 × 10  | N38               | 4.39                | 3.82      | 3.18       | 2.77     |
| M1R17-034 | Ø 30, ø 10 × 5   | N38               | 3.32                | 2.89      | 2.41       | 2.10     |
| M1R17-035 | Ø 30, ø 10 × 10  | N38               | 6.07                | 5.28      | 4.40       | 3.83     |
| M1R17-036 | Ø 30, ø 15 × 5   | N38               | 3.36                | 2.93      | 2.44       | 2.12     |
| M1R17-037 | Ø 30, ø 15 × 8   | N38               | 5.05                | 4.39      | 3.66       | 3.18     |
| M1R17-038 | Ø 40, ø 10 × 5   | N38               | 5.79                | 5.04      | 4.20       | 3.65     |
| M1R17-039 | Ø 40, ø 10 × 10  | N38               | 10.47               | 9.11      | 7.59       | 6.60     |
| M1R17-040 | Ø 40, ø 20 × 5   | N38               | 5.60                | 4.87      | 4.06       | 3.53     |
| M1R17-041 | Ø 40, ø 20 × 10  | N38               | 10.32               | 8.97      | 7.48       | 6.50     |

| Ref. No.  | Dimensions (mm)<br>D <sub>o</sub> , D <sub>i</sub> × H | Material<br>Grade | Unit Price (EUR/pc) |           |            |          |
|-----------|--|-------------------|---------------------|-----------|------------|----------|
|           |  |                   | 5-49pcs             | 50-199pcs | 200-999pcs | 1k-2kpcs |
| M1R17-042 | Ø 50, ø 20 × 5   | N38               | 8.51                | 7.40      | 6.38       | 5.55     |
| M1R17-043 | Ø 50, ø 20 × 10  | N38               | 15.47               | 13.46     | 11.60      | 10.09    |
| M1R17-044 | Ø 50, ø 30 × 5   | N38               | 7.74                | 6.73      | 5.80       | 5.04     |
| M1R17-045 | Ø 50, ø 30 × 10  | N38               | 14.24               | 12.38     | 10.67      | 9.28     |
| M1R17-046 | Ø 60, ø 20 × 5   | N38               | 14.93               | 12.99     | 11.19      | 9.73     |
| M1R17-047 | Ø 60, ø 20 × 8   | N38               | 20.67               | 17.97     | 15.49      | 13.47    |
| M1R17-048 | Ø 60, ø 25 × 5   | N38               | 14.93               | 12.99     | 11.19      | 9.73     |
| M1R17-049 | Ø 60, ø 35 × 5   | N38               | 13.02               | 11.32     | 9.76       | 8.49     |
| M1R17-050 | Ø 60, ø 40 × 5   | N38               | 11.84               | 10.29     | 8.87       | 7.72     |
| M1R17-051 | Ø 70, ø 40 × 5   | N38               | 17.84               | 15.51     | 13.37      | 11.63    |
| M1R17-052 | Ø 70, ø 45 × 5   | N38               | 16.66               | 14.49     | 12.49      | 10.86    |
| M1R17-053 | Ø 80, ø 70 × 3   | N38               | 13.89               | 12.08     | 10.41      | 9.05     |
| M1R17-054 | Ø 80, ø 50 × 5   | N38               | 22.76               | 19.79     | 17.06      | 14.84    |

The prices are FOB prices Munich/Germany and not inclusive freight fee

Minimum order in value: **EURO 100.00**

## NdFeB Ring Magnets with Multipole Radial Magnetization

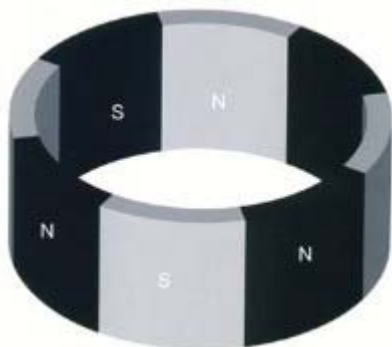


Fig. 1



Fig. 2 (skewed 45°)

| Ref. No. | Dimensions (mm)     | Magnetic Pole | Magnetization according to |
|----------|---------------------|---------------|----------------------------|
| NRMP45A  | D35 × d28 × (10-30) | 10            | Fig.2                      |
| NRMP45B  | D40 × d33 × (10-22) | 10            | Fig. 2                     |
| NRMP45C  | D42 × d35 × (10-30) | 16            | Fig. 2                     |
| NRMP90A  | D35 × d28 × (10-30) | 10            | Fig. 1                     |
| NRMP90B  | D35 × d28 × (10-30) | 8             | Fig. 1                     |