

01\_FERRITE

- POWDER
- SINTERED MAGNETS (Dry)
- RING MAGNETS (Dry)
- SINTERED MAGNETS (Wet, Anisotropic)

02\_RARE EARTH

- Nd-Fe-B SINTERED MAGNETS
- Sm-Co MAGNETS
- Sm-Fe-N BONDED MAGNETS

03\_ALNICO

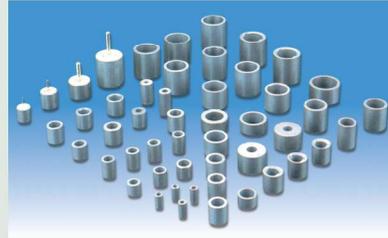
- CAST MAGNETS
- SINTERED MAGNETS



# Ring Magnet (Dry)

## Generals

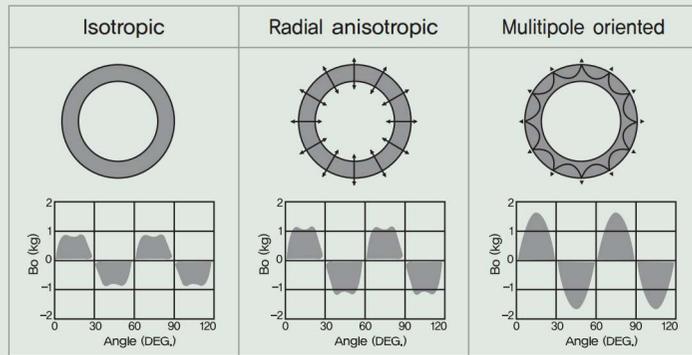
Most of them are used for small DC Motors and low noise devices and equipments due to their lower noise and vibration characteristics than segment type magnet. Especially, Ring magnets for Multipole are typically used for stepping motors



## Application

Small DC Motor – Door on-off motors for elevators, Motors for Aqua, Dish washer, Water circulation and Discharging  
Stepping Motor – ISA for automobiles, Wind direction regulator for Air conditioner, Frost remover for refrigerators.

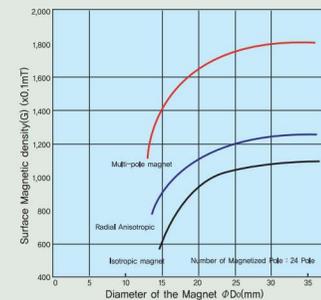
## Type of magnetic orientation



## Size

Outer Dia.	Inner Dia.	Axial Length
ø 8 ~ ø 14	ø 3 ~ ø 5	≤ 40
ø 15 ~ ø 21	ø 5 ~ ø 7	≤ 50
ø 22 ~ ø 28	ø 7 ~ ø 10	≤ 60
ø 29 ~ ø 33	ø 10 ~ ø 14	≤ 70

## Surface magnetic density



# SINTERED MAGNETS (Wet, Anisotropic)

## Generals

Ferrite magnets are composed essentially of oxide materials manufactured under a powder metallurgical process. Their magnetic properties feature a relatively low residual flux density, coupled with a high coercive force. The feature of a low recoil permeability, along with the high coercive force, makes them highly resistant to demagnetizing fields. In addition, their relatively low specific density and economical cost are also very attractive to the magnet designers. When designing the Ferrite magnets for a particular application, primary consideration should be given to its shape limitation due to the powder metallurgical manufacturing process and to the temperature dependence of Ferrite materials.

Since the magnetic characteristics of Ferrite magnets are relatively sensitive to changes in temperature, adequate consideration should be made regarding the application purpose.

## Physical Properties

Items	Unit	Value			
		PMF-2~7	PMF-9	PMF-12	PMF-15
Specific Heat*1	J/kg · K	600 ~ 800			
Thermal Conductivity	C// *3	2,0	1,8	1,5	1,5
	C⊥ *4	2,9	2,6	2,2	2,2
Flexural Strength	MPa	80			
Young's Modulus	GPa	190			
Poisson's Ratio	-	0,35			
Tensile Strength	MPa	35			
Compressive Strength	MPa	600			
Vickers Hardness	HV	750			
Electrical Resistivity	Ω · m	10^4	10^2	1	1
Coefficient of thermal expansion*2	C// *3	12 ~ 15			
	C⊥ *4	5 ~ 8			
Density	Mg/m³	4,8 ~ 5,0	4,9 ~ 5,1	5,0 ~ 5,2	5,0 ~ 5,2
Curie Temperature	K	723 ~ 733	710	689	689

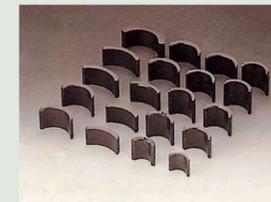
\*1 Temperature range : 20°C ~ 200°C

\*2 Temperature range : -40°C ~ 200°C

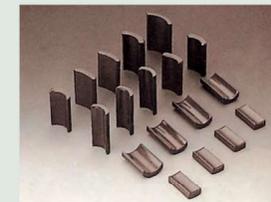
\*3 The measured value parallel to magnetization direction.

\*4 The measured value perpendicular to magnetization direction.

The physical properties on the table for the magnet is just subject for the reference value.



Ferrite magnets for electrical equipment motors



Ferrite magnets for starter and power window motors



Ferrite magnets for generators