Polymer-bonded Neodymium Magnets (NdFeB)

Sintex a/s supplies both sintered and polymer-bonded permanent magnets. All magnets are customised - or in other words - magnets are developed and manufactured on the basis of a customers sketch.

Material and production

Polymer-bonded NdFeB magnets are manufactured of powder mixed with epoxy, compacted in a matrix and heat treated.

The polymer-bonded NdFeB magnets are strong, but not as strong as sintered NdFeB magnets or as strong as the unique Sintex solution with integrated neodymium magnets.

Possibilities and advantages

Polymer-bonded NdFeB magnets are specially qualified for ar-bitrary magnetization directions. The material is isotropic, and gives freedom to magnetize in any arbitrary given direction.

Other advantages of polymer-bonded NdFeB magnets are:

- Magnetization with multiple poles
- High mechanical strength
- High magnetic strength compared to ferrites
- Geometric possibilities (Compacted individually)
- Powder savings in prod. (Compacted individually)

The maximum allowed temperature is around 140°C depending on powder grade and the epoxy. The mechanical properties of the epoxy decrease above a given temperature.

The material can corrode (however not as fast and severely as sintered NdFeB magnets) so usually some kind of coating or encapsulation is recommended.

Magnetic properties

Name	Type	Remanens Br		Hcb		Hci	(BH) max		Work. Temp.		Temp. Coeff.		Myr
		Typ.	Tol.	Typ.	Tol.	Min.	Typ.	Min.	Min.	Max.	of Br	of Hc	
		[T]	[T]	[kA/m]	[T]	[kA/m]	[KJ/m³]	[KJ/m³]	[°C]	[°C]	[%K]	[%K]	[-]
EN3-775	15-7	0.717	0.008	349	4	540	62.5	61.2	-40	80	-0.13	-0.430	1.64
EN8-775	16-7	0.744	0.016	337	7	525	62.7	60.1	-40	80	-0.12	-0.520	1.56
EN2-775	15-7	0.709	0.012	341	6	510	60.5	58.5	-40	90	-0.11	-0.400	1.65
EN7-775	16-7	0.760	0.016	357	7	520	67.7	65.0	-40	90	-0.08	-0.500	1.50
EN4-775	13-9	0.624	0.012	364	7	640	56.8	54.7	-40	120	-0.12	-0.400	1.36
EA1-775	A	0.620	0.016	399	10	1030	61.9	58.8	-40	120	-0.12	-0.400	1.24
EC1-775	C	0.620	0.016	411	10	1230	63.7	60.5	-40	120	-0.07	-0.400	1.20
EB1-775	B	0.680	0.014	388	8	640	65.9	63.3	-40	120	-0.11	-0.400	1.40
EB3-775	B	0.678	0.008	403	5	800	68.3	66.8	-40	120	-0.13	-0.400	1.34
ED1-775	D	0.674	0.012	407	7	710	68.6	66.2	-40	120	-0.07	-0.400	1.32
EB4-775	B	0.688	0.008	399	4	720	68.7	67.1	-40	120	-0.13	-0.400	1.37
EB2-775	B	0.688	0.004	403	2	730	69.3	68.6	-40	120	-0.11	-0.400	1.36
EB+1-775	B+	0.701	0.008	419	5	716	73.4	71.8	-40	120	-0.11	-0.400	1.33
EN5-775	13-9	0.624	0.012	376	7	640	58.6	56.5	-40	125	-0.12	-0.400	1.32
EN6-775	13-9	0.628	0.012	391	7	720	61.4	59.2	-40	130	-0.14	-0.360	1.28
EB+2-775	B+	0.695	0.003	411	2	750	71.4	70.8	-40	130	-0.11	-0.350	1.35
ES1-775	S-11-9	0.577	0.012	341	7	670	49.2	47.3	-40	140	-0.13	-0.400	1.35
EO1-775	O	0.632	0.012	407	7	940	64.2	61.9	-40	140	-0.13	-0.400	1.24
EN1-775	14-12	0.647	0.012	426	8	940	69.0	66.5	-40	140	-0.13	-0.400	1.21

Mechanical properties

Name	Type	Density	Vickers Hardness	Coeff. of thermal	Electrical resistivity
		[g/cm³]	[Hv]	[1/K]	[Ωcm]
EN3-775	15-7	5.90	85	4.80E-06	1.40E-02
EN8-775	16-7	5.90	85	4.80E-06	1.40E-02
EN2-775	15-7	5.91	85	4.80E-06	1.40E-02
EN7-775	16-7	5.91	85	4.80E-06	1.40E-02
EN4-775	13-9	5.86	85	4.80E-06	1.40E-02
EA1-775	A	5.90	85	4.80E-06	1.40E-02
EC1-775	C	5.98	85	4.80E-06	1.40E-02
EB1-775	B	5.92	85	4.80E-06	1.40E-02
EB3-775	B	5.89	85	4.80E-06	1.40E-02
ED1-775	D	5.98	85	4.80E-06	1.40E-02
EB4-775	B	5.90	85	4.80E-06	1.40E-02
EB2-775	B	5.91	85	4.80E-06	1.40E-02
EB+1-775	B+	5.92	85	4.80E-06	1.40E-02
EN5-775	13-9	5.79	85	4.80E-06	1.40E-02
EN6-775	13-9	5.80	85	4.80E-06	1.40E-02
EB+2-775	B+	5.91	85	4.80E-06	1.40E-02
ES1-775	S-11-9	5.76	85	4.80E-06	1.40E-02
EN01-775	0	5.90	85	4.80E-06	1.40E-02
EN1-775	14-12	5.91	85	4.80E-06	1.40E-02

Characterising magnets

The most important properties to take into consideration for characterising the magnets are:

- Magnetic properties such as remanence Br, coercivity Hcb, intrinsic coercivity Hci and max. energy product (BH) max.
- Dimensions and tolerances
- Force (for holding magnets), Torque (for motors), Field strength (for sensors)
- Minimum and maximum operation / working temp.
- Area of application usage - e.g. aquatic environment
- Requirements concerning surface coating

Results

The magnetic and mechanical data shown in this data sheet are the result of tests and calculations done on untreated magnet blocks with a density of 77,5% compared with solid powder.

It may not be possible to directly attribute all the above given results to individual magnets. Before you use the information and results, you are therefore encouraged to seek personal assistance and advice from the magnet specialists at Sintex a/s.

Please contact us for more information.

Version 2020-03-24