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APPENDICES

Nxx?? Material		Br		Hc (Hcb)		Hci (Hcj)		BHmax	
		mT	G	kA/m	Oe	kA/m	Oe	kJ/m ³	MGOe
N27		1,030	10,300	796	10,000	955	12,000	199	25
N30		1,080	10,800	796	10,000	955	12,000	223	28
N33		1,130	11,300	836	10,500	955	12,000	247	31
N35		1,170	11,700	867	10,900	955	12,000	263	33
N38		1,210	12,100	899	11,300	955	12,000	287	36
N40		1,240	12,400	923	11,600	955	12,000	302	38
N42		1,280	12,800	923	11,600	955	12,000	318	40
N45		1,320	13,200	875	11,000	955	12,000	342	43
N48		1,380	13,800	836	10,500	875	11,000	366	46
N50		1,400	14,000	796	10,000	875	11,000	382	48
N52		1,430	14,300	796	10,000	875	11,000	398	50
N27	M	1,030	10,300	796	10,000	1,114	14,000	199	25
N30	M	1,080	10,800	796	10,000	1,114	14,000	223	28

Appendix 1: Neodymium Magnet Properties. N35 Magnet properties is the Highlighted.

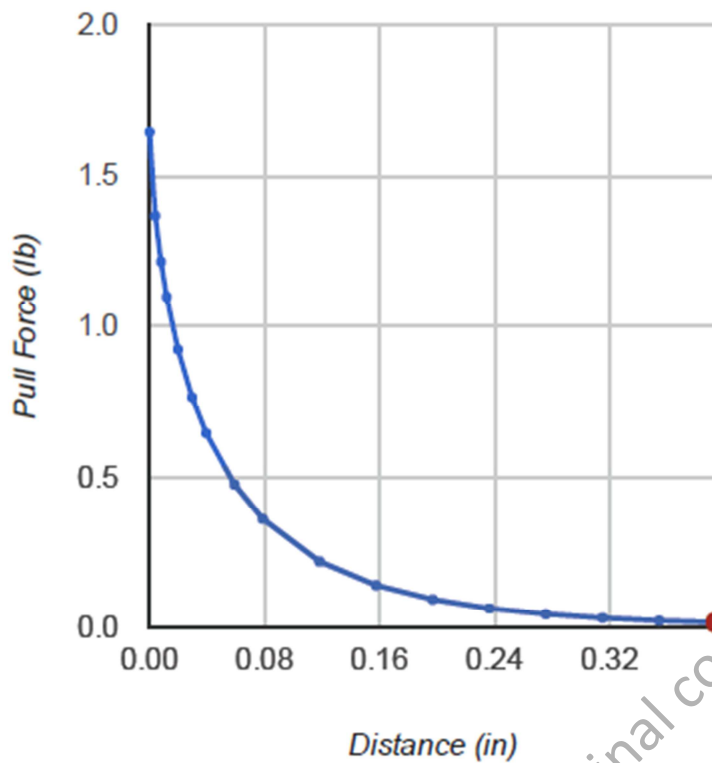
[4]

Characteristic	Symbol	Unit	Value
Density	D	g/cm	7.5
Vickers Hardness	Hv	D.P.N	570
Compression Strength	C.S	N/mm ²	780
Coefficient of Thermal Expansion	C//	10 ⁻⁶ /°C	3.4
	Ct	10 ⁻⁶ /°C	-4.8
Electrical Resistivity	p	μ Ω.cm	150
Temperature coefficient of resistivity	α	10 ⁻⁴ /°C	2
Electrical Conductivity	σ	10 ⁶ S/m	0.667
Thermal Conductivity	k	kCal/(m.h.°C)	7.7
Specific Heat Capacity	c	kCal/(kg.°C)	0.12
Tensile Strength	σ _{UTS} or S _U	kg/mm ²	8
Young's Modulus	λ / E	1011N/m ²	1.6
Flexural Strength	β	10-12m ² /N	9.8
Compressibility	σ	10-12m ² /N	9.8
Rigidity	E.I	N/m ²	0.64
Poisson's Ratio	v		0.24
Curie Temperature	Tc	°C	310

Appendix 2: Physical Properties of Neodymium Magnet. [4]

Torque Units	Units Speed	Conversion Factor
oz-in	RPM	0.00074
oz-in	rad/sec	0.0071
in-lb	RPM	0.0118
in-lb	rad/sec	0.1130
ft-lb	RPM	0.1420
ft-lb	rad/sec	1.3558
N-m	RPM	0.1047

Appendix 3: Conversion Factor from Torque to Angular Speed [14]



Appendix 4: Graph of Pull Force(lb) versus Distance (inches). [15]

TABLE 4-2 Coefficients of Friction [†]		
Surfaces	Coefficient of Static Friction, μ_s	Coefficient of Kinetic Friction, μ_k
Wood on wood	0.4	0.2
Ice on ice	0.1	0.03
Metal on metal (lubricated)	0.15	0.07
Steel on steel (unlubricated)	0.7	0.6
Rubber on dry concrete	1.0	0.8
Rubber on wet concrete	0.7	0.5
Rubber on other solid surfaces	1-4	1
Teflon [®] on Teflon in air	0.04	0.04
Teflon on steel in air	0.04	0.04
Lubricated ball bearings	<0.01	<0.01
Synovial joints (in human limbs)	0.01	0.01

[†] Values are approximate and intended only as a guide.

Appendix 5: Friction Coefficient Table. [16]

Specification of RF370CA15 DC Motor	
Operating range	3.0 ~ 12.0 V
Nominal Voltage	12 V
No. Load Speed	5600 rpm
No. Load Current	0.022 A
Max Efficiency Speed	4906 rpm
Max Efficiency Current	0.16~0.23 A
Max Efficiency Torque	21.1 g.cm
Stall Torque	170 g.cm
Stall Current	1.1~1.5 A
Body Diameter	24.4
Body Length	32.5mm
Shaft Diameter	2mm
Shaft Length	10.5 mm
Weight	50 grams
Contacts	: 2mm x 3.9mm

Appendix 6: Specification of 12 Volts DC Motor