

# Superior Performance & Excellent Thermal Stability



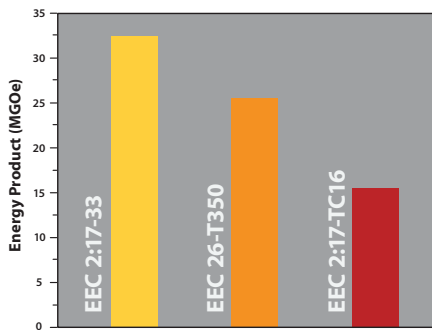
## The Premier Source for Samarium Cobalt

Since the introduction of rare earth magnets in the 1970s, Electron Energy Corporation (EEC) has been the preferred source for producing and supplying samarium cobalt (SmCo) magnets. EEC's SmCo 33 grade material is one of the highest performance materials available and is ideal across a range of applications from biomedical devices to motors and generators.

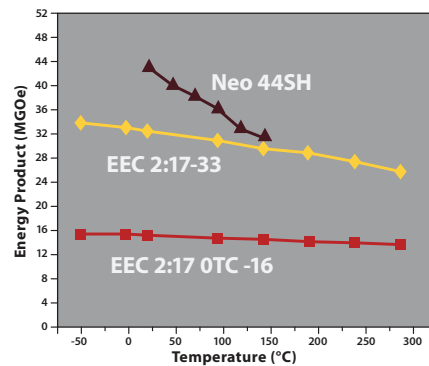
## More Than Just Your Supplier

As a producer of permanent magnet materials, EEC has a deep understanding of the science behind the materials. This insight separates EEC from competitors and allows its engineering team to provide best-in-class service to customers. EEC's applications engineering team works closely with customers to develop magnetic solutions and optimize design performance. In addition to applications engineering, EEC also provides magnetic circuit design and research and development services.

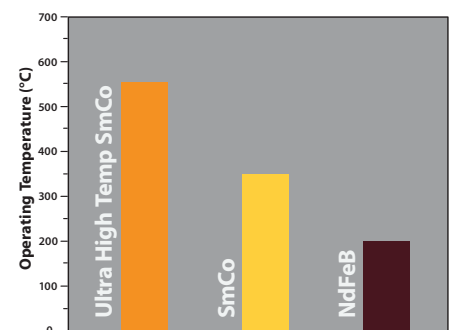
**Energy Product**



**Energy Product vs. Temperature**



**Max. Operating Temperatures**



### Samarium Cobalt (SmCo)

- High energy (up to 33MGOe)
- Max operating temperature (up to 320°C)
- Superior corrosion resistance
- High resistance to demagnetization

### Ultra-High Temperature SmCo

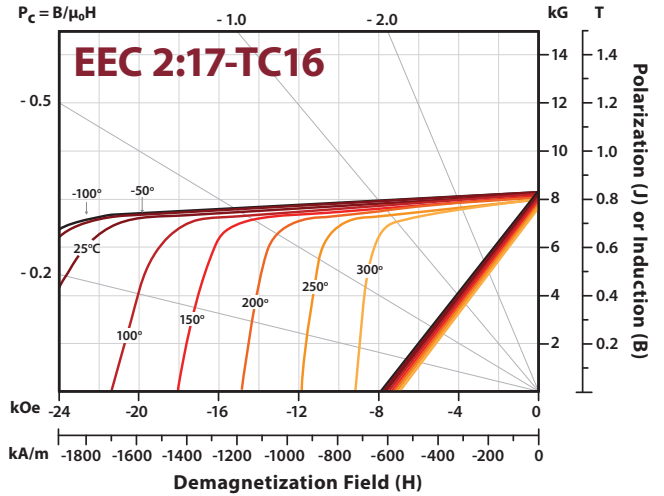
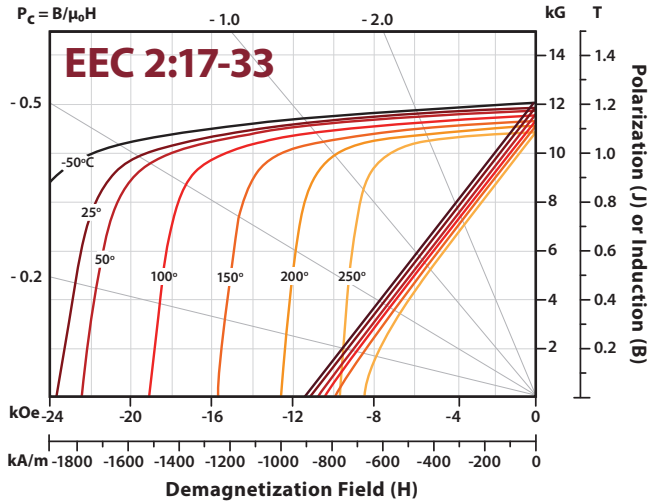
- Capable to operate at extreme temperatures (400°C to 550°C)
- Ideal for high-temperature applications (> 400°C should be plated)
- High demagnetization resistance

### Temperature Compensated SmCo

- High energy (up to 22 MGOe)
- Small reversible temperature coefficient of  $B_r$  (-50 to 150°C)
- Corrosion and demagnetization resistance

### SmCo is the ultimate choice for high-performance applications including:

- High-Speed Motors
- Generators and Actuators
- Microwave Signal Amplification
- Aircraft and Aerospace Assemblies
- Biomedical and Surgical Equipment
- Oil and Gas Exploration



**Magnetic Properties of SmCo Magnets**

Magnet Grade	Maximum Energy Product (BH) <sub>max</sub>				Residual Induction B <sub>r</sub>				Coercivity H <sub>c</sub>				Intrinsic Coercivity iH <sub>c</sub>		RTC of B <sub>r</sub> <sup>(1)</sup>	Max. Operating Temp. <sup>(2)</sup>
	MGOe		kJ/m <sup>3</sup>		kG		T		kOe		kA/m		kOe	kA/m	%/°C	°C
	Typ	Min	Typ	Min	Typ	Min	Typ	Min	Typ	Min	Typ	Min	Min	Min	Typ	Typ
<b>Sm<sub>2</sub>Co<sub>17</sub> Magnets</b>																
EEC 2:17-34	34	32	271	255	11.9	11.70	1.19	1.17	11.1	10.8	884	860	18	1433	-0.040	250
EEC 2:17-33	33	31	263	247	11.65	11.40	1.17	1.14	10.9	10.4	868	828	18	1433	-0.040	250
EEC 2:17-31	31	29	247	231	11.50	11.20	1.15	1.12	10.7	10.2	852	812	20	1592	-0.035	300
EEC 2:17-30	30	28	239	223	11.25	11.00	1.13	1.10	10.6	10.1	844	804	20	1592	-0.035	300
EEC 2:17-29	29	27	231	215	11.00	10.70	1.10	1.07	10.5	10.0	836	796	24	1910	-0.035	320
EEC 2:17-27	27	25	215	199	10.75	10.50	1.08	1.05	10.3	9.8	821	780	24	1910	-0.035	320
EEC 2:17-24	24	22	191	175	10.00	9.70	1.00	0.97	9.5	9.0	756	716	24	1910	-0.035	320
<b>Sm<sub>2</sub>Co<sub>17</sub> Temperature Compensated Magnets</b>																
EEC 2:17-TC22	22	20	175	159	9.65	9.25	0.97	0.93	9.2	8.9	732	708	24	1910	-0.030	320
EEC 2:17-TC20	20	18	159	143	9.15	8.75	0.92	0.88	8.8	8.4	700	669	24	1910	-0.025	320
EEC 2:17-TC18	18	16	143	127	8.65	8.25	0.87	0.83	8.2	7.8	653	621	24	1910	-0.010	320
EEC 2:17-TC16	16	14	127	111	8.15	7.75	0.82	0.78	7.8	7.4	621	589	24	1910	-0.001	320
EEC 2:17-TC15	15	13	119	103	7.70	7.50	0.77	0.75	7.3	6.9	581	549	24	1910	-0.001	320
EEC 2:17-TC13	13	11	103	88	7.40	7.00	0.74	0.70	6.8	6.4	541	509	24	1910	0.008	320
EEC 2:17-TC7	7	5	56	40	5.60	5.20	0.56	0.52	4.9	4.5	390	358	24	1910	-0.004	320
EEC 2:17-TC5	5	3	40	24	4.70	4.30	0.47	0.43	4	3.5	318	279	24	1910	-0.008	320
EEC 2:17-TC4	4	2	32	16	4.20	3.80	0.42	0.38	3.5	3.0	279	239	24	1910	0.010	320
<b>Sm<sub>2</sub>Co<sub>17</sub> Ultra High Temperature Magnets</b>																
EEC 26-T350	26	24	207	191	10.5	10.0	1.05	1.00	9.9	9.5	788	756	24	1910	-0.035	350
EEC 24-T400	24	22	191	175	10.0	9.6	1.00	0.96	9.5	9.1	756	724	24	1910	-0.035	400
EEC 22-T450	22	20	175	159	9.6	9.2	0.96	0.92	9.1	8.7	724	693	24	1910	-0.035	450
EEC 20-T500	20	18	159	143	9.2	8.8	0.92	0.88	8.8	8.4	700	669	24	1910	-0.035	500
EEC 18-T550	18	15	143	119	8.7	8.3	0.87	0.83	8.2	7.7	653	613	24	1910	-0.035	550
<b>SmCo<sub>5</sub> Magnets</b>																
EEC 1:5-24	24	22	191	175	9.7	9.4	0.97	0.94	9.4	9.0	748	716	24	1910	-0.04	300
EEC 1:5-22	22	20	175	159	9.3	9.0	0.93	0.90	9.0	8.6	716	685	24	1910	-0.04	300
EEC 1:5-20	20	18	159	143	9.0	8.5	0.90	0.85	8.7	8.2	693	65.3	24	1910	-0.04	300
EEC 1:5-18	18	16	143	127	8.5	8.1	0.85	0.81	8.3	7.9	661	62.9	24	1910	-0.04	300
<b>SmCo<sub>5</sub> Temperature Compensated Magnets</b>																
EEC 1:5 TC15	15	13	119	103	7.8	7.5	0.78	0.75	7.6	7.3	605	581	24	1910	-0.034	300
EEC 1:5 TC13	13	11	103	88	7.3	7.0	0.73	0.70	7.2	6.8	573	541	24	1910	-0.025	300
EEC 1:5 TC11	11	9	88	72	6.7	6.3	0.67	0.63	6.5	6.1	517	486	24	1910	-0.015	300
EEC 1:5 TC9	9	7	72	56	6.1	5.7	0.61	0.57	6.0	5.6	478	446	24	1910	-0.001	300
EEC 1:5 TC7	7	6	56	48	5.4	5.0	0.54	0.50	5.3	4.9	422	390	24	1910	0.012	300
EEC 1:5 TC6	6	5	48	40	5.0	4.5	0.50	0.45	4.8	4.3	382	342	24	1910	0.025	300
EEC 1:5 TC5	5	4	40	32	4.6	4.1	0.46	0.41	4.0	3.6	318	287	24	1910	-0.03	300
EEC 1:5 TC4	4	3	32	24	4.0	3.5	0.40	0.35	3.5	3.1	279	247	24	1910	-0.018	300
EEC 1:5 TC3	3	2	24	16	3.5	3.0	0.35	0.30	3.1	2.6	247	207	24	1910	-0.002	300
EEC 1:5 TC2	2	1	16	8	2.8	2.3	0.28	0.23	2.5	2.0	199	159	24	1910	0.025	300

(1) Typical reversible temperature coefficient (RTC) of B<sub>r</sub> calculated between -50 and 150°C. It is for reference only. (2) Maximum operating temperature has strong dependence on the loadline and operating environment. Consult EEC engineering for details.

