

RECOMA

The complete range of SmCo_5 and $\text{Sm}_2\text{Co}_{17}$ alloys

Since the beginning of rare earth magnet production in the early 1970's, Recoma[®] has been a synonym for high quality SmCo materials. The combination of excellent magnetic properties with superior temperature and corrosion stability has made these materials the standard for applications in demanding environments.

Offering the best magnetic properties at elevated temperatures, SmCo magnets are widely used in the chemical and aerospace industries, as well as in many automotive "under the hood" applications. Owing to their superior corrosion stability, SmCo magnets can in most cases be used without protective coating. And since they show little or no surface degradation during machining, SmCo are the ideal materials for rare earth micromagnets.

There are two families of SmCo materials. The $\text{Sm}_2\text{Co}_{17}$ magnets show the highest magnetic performance at elevated temperatures. Magnets based on SmCo_5 offer easy magnetizing in moderate fields and the best corrosion resistance of all rare earth magnets.

The most common Recoma materials are presented in detail on the following pages. In addition to these main grades, materials with rather unique properties are available: Materials where the temperature coefficient of magnetization can be adjusted to a preferred value (including zero), or materials for highest operating temperatures up to 500°C and beyond. These materials are usually customized to the requirements of the individual customer. Please contact us for a solution to your application needs.

RECOMA®

Summary of main grades of SmCo₅ and Sm₂Co₁₇

Product	Designator ⁽¹⁾	(BH)max				Br				Hcb				Intrinsic Coercivity Hcj				Density g/cm ³	Magnetizing Field ⁽²⁾ kA/m	Temperature Coefficient of Br (20-150°C) %/K	Maximum Operating Temperature ⁽³⁾ °C
		kJ/m ³		MGOe		T		kG		kA/m		kOe		kA/m		kOe					
		typ	min	typ	min	typ	min	typ	min	typ	min	typ	min	typ	min	typ	min				
Recoma 18	(135/200) A	143	135	18.0	17.0	0.87	0.83	8.7	8.3	650	600	8.2	7.5	2400	2000	30	25	8.4	>2000	-0.045	250
Recoma 20	(140/200) A	160	140	20.1	17.6	0.90	0.85	9.0	8.5	700	640	8.8	8.0	2400	2000	30	25	8.4	>2000	-0.045	250
Recoma 22	(155/200) T	175	155	22.0	19.5	0.94	0.90	9.4	9.0	730	680	9.2	8.6	2400	2000	30	25	8.4	>2000	-0.045	250
Recoma 25	(180/200) T	200	180	25.1	22.6	1.00	0.97	10.0	9.7	775	720	9.7	9.1	2400	2000	30	25	8.4	>2000	-0.050	250
Recoma 24HE	(175/150) A	195	175	24.5	22.0	1.02	0.97	10.2	9.7	765	715	9.6	9.0	2000	1500	25	19	8.4	>4000	-0.035	350
Recoma 26	(185/120) A	205	185	25.8	23.2	1.04	1.00	10.4	10.0	765	680	9.6	8.6	2000	1200	25	15	8.3	>4000	-0.035	350
Recoma 26HE	(195/150) T	215	195	27.0	24.5	1.07	1.03	10.7	10.3	800	755	10.1	9.5	2000	1500	25	19	8.4	>4000	-0.035	350
Recoma 28	(195/120) T	225	195	28.3	24.5	1.10	1.04	11.0	10.4	800	700	10.1	8.8	2000	1200	25	15	8.3	>4000	-0.035	350
Recoma 28HE	(215/150) T	225	215	28.3	27.0	1.10	1.06	11.0	10.6	805	775	10.1	9.7	2000	1500	25	19	8.4	>4000	-0.035	350
Recoma 30	(215/104) T	230	215	28.9	27.0	1.12	1.09	11.2	10.9	820	700	10.3	8.8	1600	1040	20	13	8.3	>4000	-0.035	250
Recoma 30HE	(215/150) T	230	215	28.9	27.0	1.12	1.09	11.2	10.9	830	795	10.4	10.0	2000	1500	25	19	8.3	>4000	-0.035	350
Recoma 30S	(225/175) T	235	225	29.5	28.3	1.12	1.09	11.2	10.9	845	820	10.6	10.3	2150	1750	27	22	8.3	>4000	-0.035	350
Recoma 32	(225/104) T	240	225	30.2	28.3	1.15	1.12	11.5	11.2	835	640	10.5	8.0	1350	1040	17	13	8.3	>4000	-0.035	250
Recoma 32S	(223/159) T	245	223	30.8	28.0	1.15	1.12	11.5	11.2	850	780	10.7	9.8	1790	1590	22.5	20	8.3	>4000	-0.035	250
Recoma 33E	(238/175) T	251	238	31.5	29.9	1.16	1.14	11.6	11.4	865	845	10.9	10.6	2100	1750	26.4	22	8.3	>4000	-0.035	350
Recoma 35E	(255/171) T	265	255	33.3	32.0	1.19	1.17	11.9	11.7	880	860	11.1	10.8	1800	1710	23	21	8.3	>4000	-0.035	300

1) A = Axial; T = Transverse or Isostatic

2) Magnetizing Field - Values are dependent on size, shape and characteristics of the magnetizing pulse

3) Maximum Operating Temperature - In the presence of strong demagnetizing fields or if the magnets operate on a low loadline, the maximum temperature may be considerably lower.

High Temperature and Temperature Stabilized grades are also available.
Please consult your Arnold representative to learn more about these products.

Dimensions and shape of the magnet, in combination with required manufacturing processes, may cause the magnetic and physical characteristics to vary from typical values. Therefore, all data presented in this document are for general reference only and should not be relied upon to represent standard characteristics, nor are they guaranteed upon use. Arnold Magnetic Technologies reserves the right to change information in this document, including magnet performance standards, specifications, and characteristics without notice.

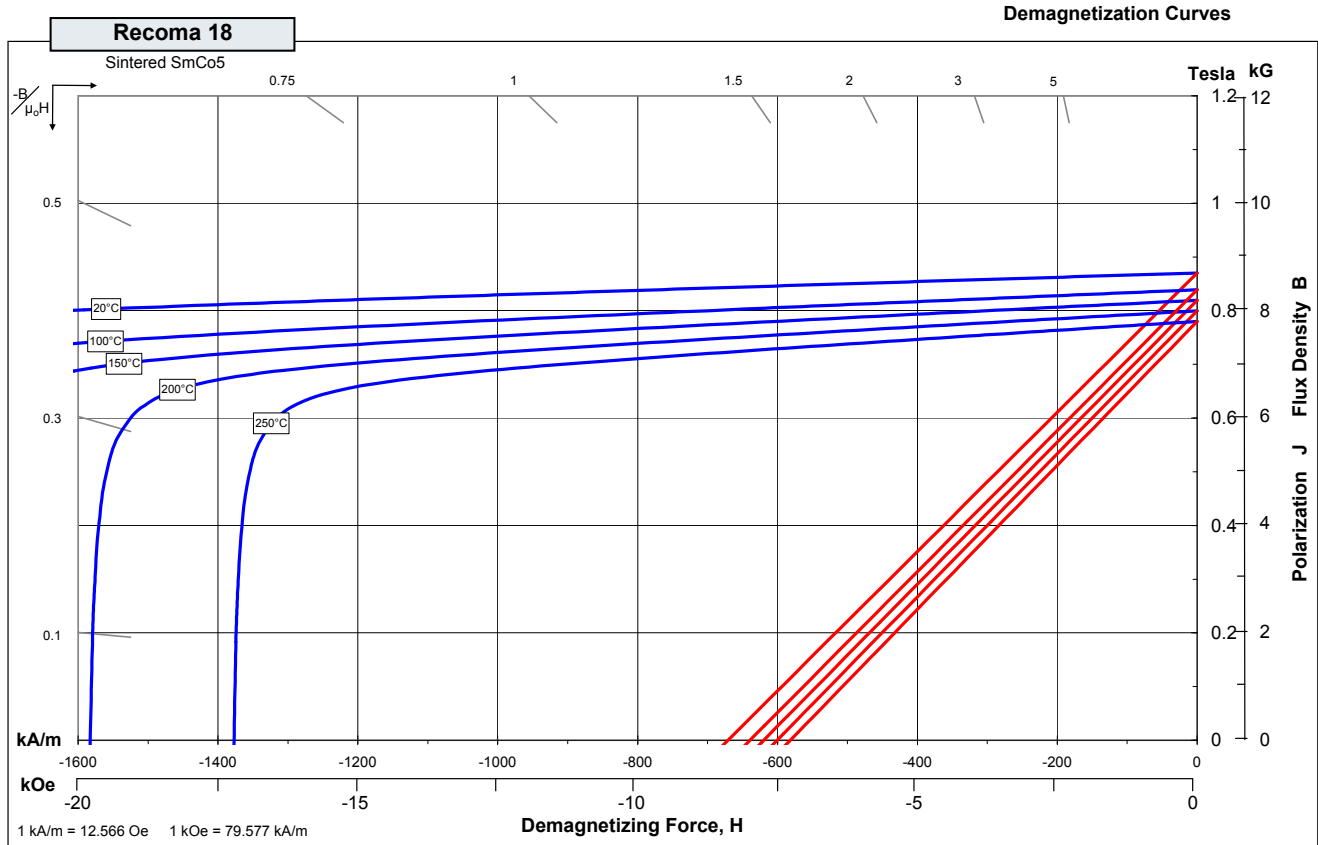
Recoma® Sintered Samarium Cobalt Magnets

These are also referred to as Rare Earth or SmCo magnets. The Recoma family of materials offer a combination of high magnetic output and excellent temperature stability. Please contact Arnold for additional grade information, application assistance and recommendations for protective coatings. Assemblies using these magnets can also be provided.

Characteristic	Units	Magnetic Properties	
		min.	nominal
Br , Residual Induction	Gauss	8,300	8,700
	Tesla	0.83	0.87
H_{cB} , Coercivity	Oersteds	7,540	8,170
	kA/m	600	650
H_{cJ} , Intrinsic Coercivity	Oersteds	25,000	30,000
	kA/m	2,000	2,400
BH_{max} , Maximum Energy Product	MGOe	17	18
	kJ/m ³	135	143

Characteristic	Units	Thermal Properties	
		C //	C ⊥
Reversible Temperature Coefficients ⁽¹⁾	of Induction, α(Br)	%/°C	-0.045
	of Coercivity, α(H _{cj})	%/°C	-0.19
	Coefficient of Thermal Expansion ⁽²⁾	ΔL/L per °C x 10 ⁻⁶	7
Thermal Conductivity	W/(m·K)	11	
Specific Heat ⁽³⁾	J/(kg·K)	370	
Max. Recommended Use Temperature	°C	250	
Curie Temperature, T _c	°C	725	
Other Properties	Flexural Strength	psi	17,400
		MPa	120
	Compressive Strength	psi	145,000
		MPa	1000
	Young's Modulus	GPa	140
	Density	g/cm ³	8.4
	Hardness, Vickers	Hv	600
Electrical Resistivity, ρ	μΩ · cm	55	

Notes: (1) Coefficients measured between 20 and 150 °C
 (2) Between 20 and 200 °C (3) Between 20 and 150 °C



Notes The material data and demagnetization curves shown above represent typical properties that may vary due to product shape and size. Demagnetization curves show nominal Br and H_{cj}. Magnets can be supplied thermally stabilized or magnetically calibrated to customer specifications. Additional grades are available. Please contact the factory for information.

Dimensions and shape of the magnet, in combination with required manufacturing processes, may cause the magnetic and physical characteristics to vary from typical values. Therefore, all data presented in this document are for general reference only and should not be relied upon to represent standard characteristics, nor are they guaranteed upon use. Arnold Magnetic Technologies reserves the right to change information in this document, including magnet performance standards, specifications, and characteristics without notice.

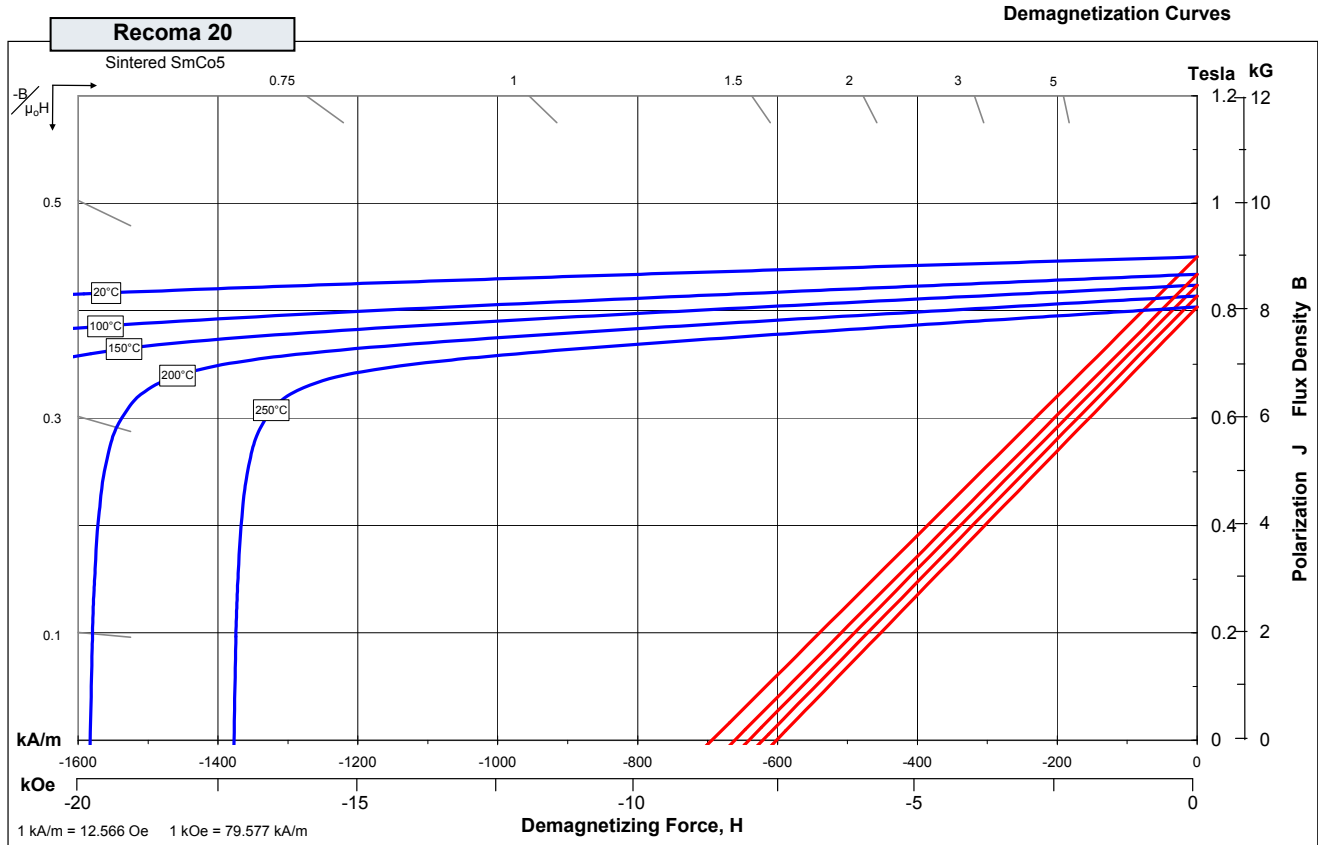
Recoma® Sintered Samarium Cobalt Magnets

These are also referred to as Rare Earth or SmCo magnets. The Recoma family of materials offer a combination of high magnetic output and excellent temperature stability. Please contact Arnold for additional grade information, application assistance and recommendations for protective coatings. Assemblies using these magnets can also be provided.

Characteristic	Units	Magnetic Properties	
		min.	nominal
Br , Residual Induction	Gauss	8,500	9,000
	Tesla	0.85	0.90
H_{cB} , Coercivity	Oersteds	8,040	8,800
	kA/m	640	700
H_{cJ} , Intrinsic Coercivity	Oersteds	25,000	30,000
	kA/m	2,000	2,400
BH_{max} , Maximum Energy Product	MGOe	18	20
	kJ/m ³	140	160

Characteristic	Units	Thermal Properties	
		C //	C ⊥
Reversible Temperature Coefficients ⁽¹⁾	of Induction, α(Br)	%/°C	-0.045
	of Coercivity, α(H _{cj})	%/°C	-0.19
	Coefficient of Thermal Expansion ⁽²⁾	ΔL/L per °C x 10 ⁻⁶	7
Thermal Conductivity	W/(m·K)	11	
Specific Heat ⁽³⁾	J/(kg·K)	370	
Max. Recommended Use Temperature	°C	250	
Curie Temperature, T _c	°C	725	
Other Properties	Flexural Strength	psi	17,400
		MPa	120
	Compressive Strength	psi	145,000
		MPa	1000
	Young's Modulus	GPa	140
	Density	g/cm ³	8.4
	Hardness, Vickers	Hv	600
Electrical Resistivity, ρ	μΩ · cm	55	

Notes: (1) Coefficients measured between 20 and 150 °C
 (2) Between 20 and 200 °C (3) Between 20 and 150 °C



Notes The material data and demagnetization curves shown above represent typical properties that may vary due to product shape and size. Demagnetization curves show nominal Br and H_{cj}. Magnets can be supplied thermally stabilized or magnetically calibrated to customer specifications. Additional grades are available. Please contact the factory for information.

Dimensions and shape of the magnet, in combination with required manufacturing processes, may cause the magnetic and physical characteristics to vary from typical values. Therefore, all data presented in this document are for general reference only and should not be relied upon to represent standard characteristics, nor are they guaranteed upon use. Arnold Magnetic Technologies reserves the right to change information in this document, including magnet performance standards, specifications, and characteristics without notice.

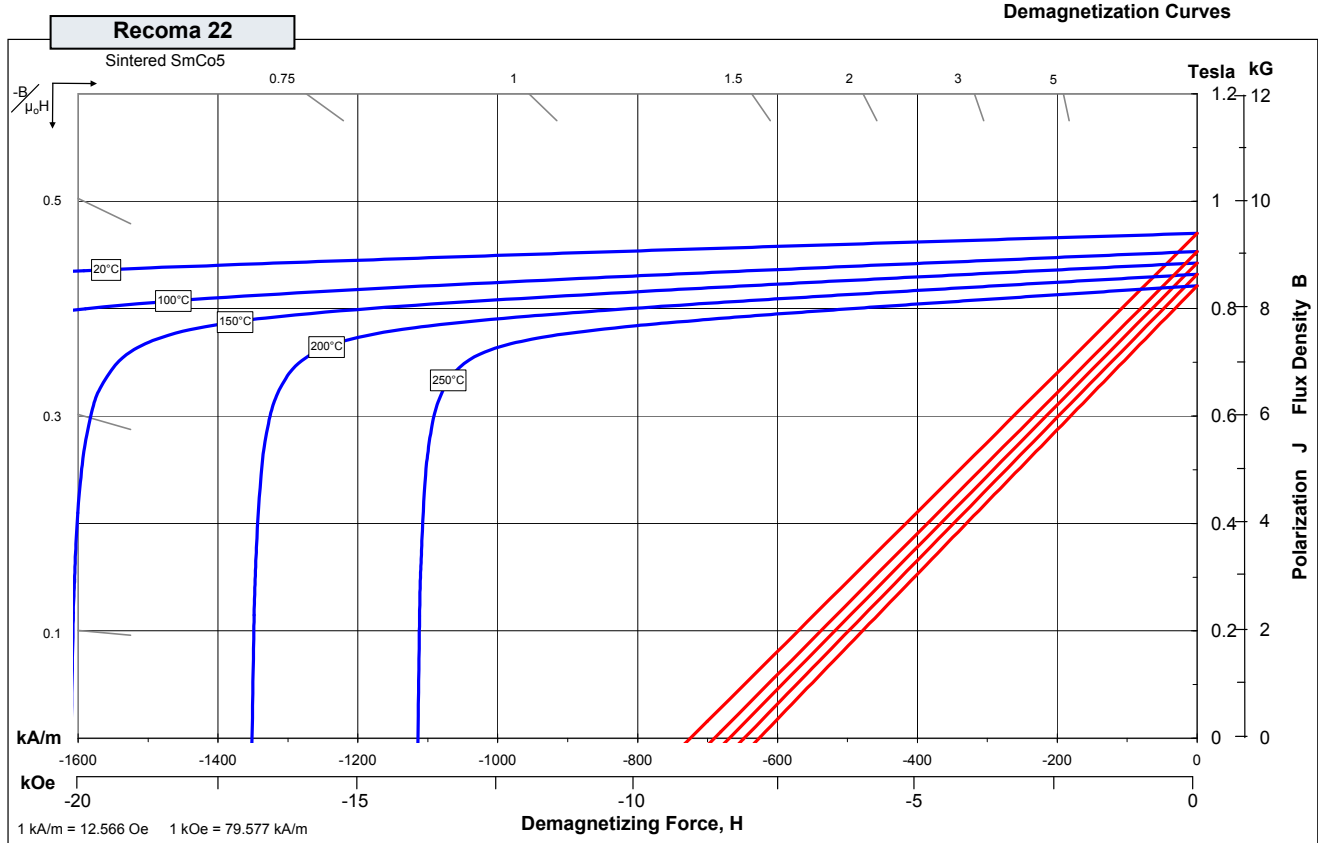
Recoma® Sintered Samarium Cobalt Magnets

These are also referred to as Rare Earth or SmCo magnets. The Recoma family of materials offer a combination of high magnetic output and excellent temperature stability. Please contact Arnold for additional grade information, application assistance and recommendations for protective coatings. Assemblies using these magnets can also be provided.

Characteristic	Units	Magnetic Properties	
		min.	nominal
Br , Residual Induction	Gauss	9,000	9,400
	Tesla	0.90	0.94
H_{CB} , Coercivity	Oersteds	8,550	9,170
	kA/m	680	730
H_{CJ} , Intrinsic Coercivity	Oersteds	25,000	30,000
	kA/m	2,000	2,400
BH_{max} , Maximum Energy Product	MGOe	20	22
	kJ/m ³	155	175

Characteristic	Units	Thermal Properties	
		C //	C ⊥
Reversible Temperature Coefficients ⁽¹⁾	of Induction, α(Br)	%/°C	-0.045
	of Coercivity, α(Hcj)	%/°C	-0.25
	Coefficient of Thermal Expansion ⁽²⁾	ΔL/L per °C x 10 ⁻⁶	7
Thermal Conductivity	W/(m·K)	11	
Specific Heat ⁽³⁾	J/(kg·K)	370	
Max. Recommended Use Temperature	°C	250	
Curie Temperature, T _c	°C	725	
Other Properties	Flexural Strength	psi	17,400
		MPa	120
	Compressive Strength	psi	145,000
		MPa	1000
	Young's Modulus	GPa	140
	Density	g/cm ³	8.4
	Hardness, Vickers	Hv	600
Electrical Resistivity, ρ	μΩ · cm	55	

Notes: (1) Coefficients measured between 20 and 150 °C
 (2) Between 20 and 200 °C (3) Between 20 and 150 °C



Notes The material data and demagnetization curves shown above represent typical properties that may vary due to product shape and size. Demagnetization curves show nominal Br and Hcj. Magnets can be supplied thermally stabilized or magnetically calibrated to customer specifications. Additional grades are available. Please contact the factory for information.

Dimensions and shape of the magnet, in combination with required manufacturing processes, may cause the magnetic and physical characteristics to vary from typical values. Therefore, all data presented in this document are for general reference only and should not be relied upon to represent standard characteristics, nor are they guaranteed upon use. Arnold Magnetic Technologies reserves the right to change information in this document, including magnet performance standards, specifications, and characteristics without notice.

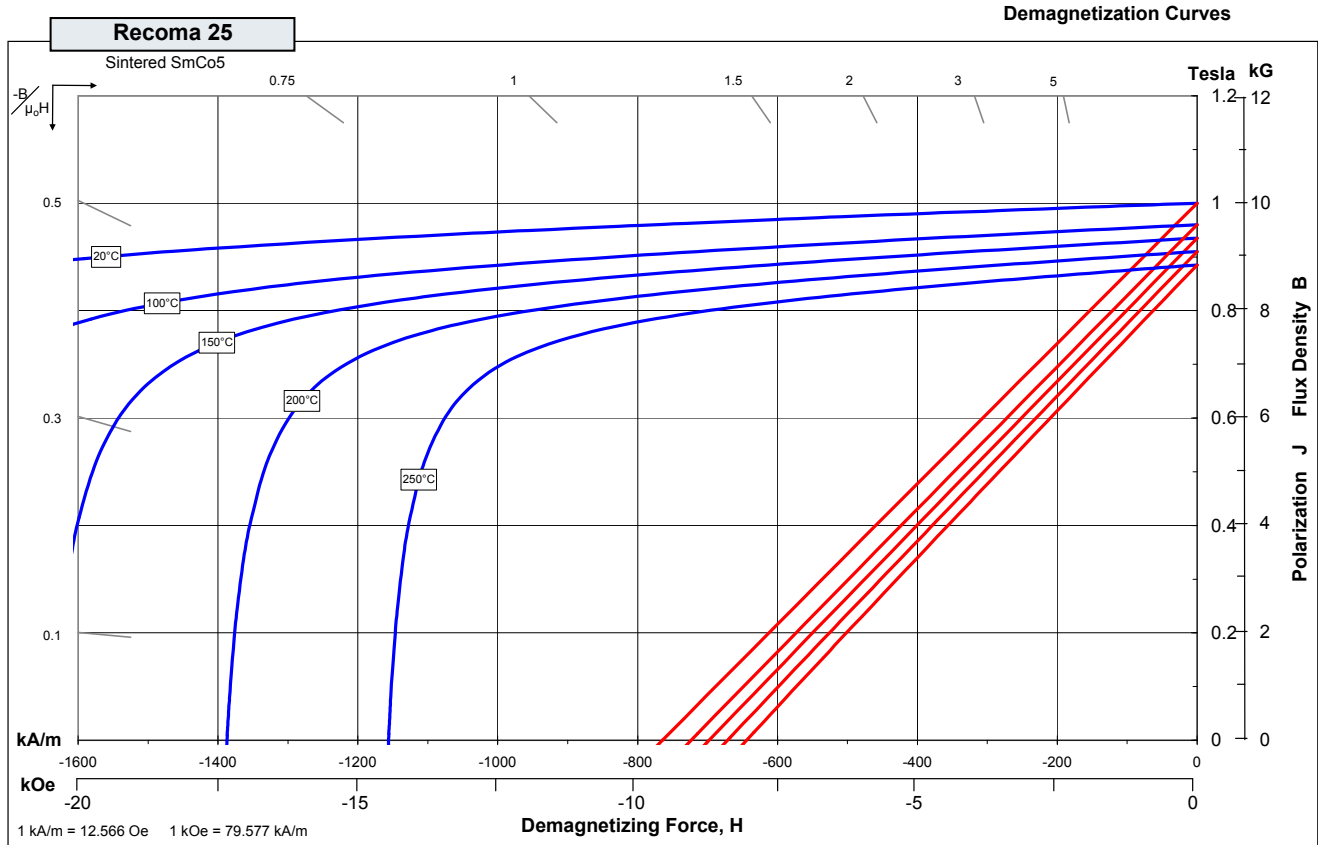
Recoma® Sintered Samarium Cobalt Magnets

These are also referred to as Rare Earth or SmCo magnets. The Recoma family of materials offer a combination of high magnetic output and excellent temperature stability. Please contact Arnold for additional grade information, application assistance and recommendations for protective coatings. Assemblies using these magnets can also be provided.

Characteristic	Units	Magnetic Properties	
		min.	nominal
Br , Residual Induction	Gauss	9,700	10,000
	Tesla	0.97	1.00
H_{CB} , Coercivity	Oersteds	9,050	9,740
	kA/m	720	775
H_{CJ} , Intrinsic Coercivity	Oersteds	25,000	30,000
	kA/m	2,000	2,400
BH_{max} , Maximum Energy Product	MGOe	23	25
	kJ/m ³	180	200

Characteristic	Units	Thermal Properties	
		C //	C ⊥
Reversible Temperature Coefficients ⁽¹⁾	of Induction, α(Br)	%/°C	-0.05
	of Coercivity, α(H _{Cj})	%/°C	-0.24
	Coefficient of Thermal Expansion ⁽²⁾	ΔL/L per °Cx10 ⁻⁶	7
Thermal Conductivity	W/(m·K)	11	
Specific Heat ⁽³⁾	J/(kg·K)	370	
Max. Recommended Use Temperature	°C	250	
Curie Temperature, T _c	°C	725	
Other Properties	Flexural Strength	psi	17,400
		MPa	120
	Compressive Strength	psi	145,000
		MPa	1000
	Young's Modulus	GPa	140
	Density	g/cm ³	8.4
	Hardness, Vickers	Hv	560
Electrical Resistivity, ρ	μΩ · cm	55	

Notes: (1) Coefficients measured between 20 and 150 °C
 (2) Between 20 and 200 °C (3) Between 20 and 150 °C



Notes The material data and demagnetization curves shown above represent typical properties that may vary due to product shape and size. Demagnetization curves show nominal Br and H_{Cj}. Magnets can be supplied thermally stabilized or magnetically calibrated to customer specifications. Additional grades are available. Please contact the factory for information.

Dimensions and shape of the magnet, in combination with required manufacturing processes, may cause the magnetic and physical characteristics to vary from typical values. Therefore, all data presented in this document are for general reference only and should not be relied upon to represent standard characteristics, nor are they guaranteed upon use. Arnold Magnetic Technologies reserves the right to change information in this document, including magnet performance standards, specifications, and characteristics without notice.

Recoma 24HE

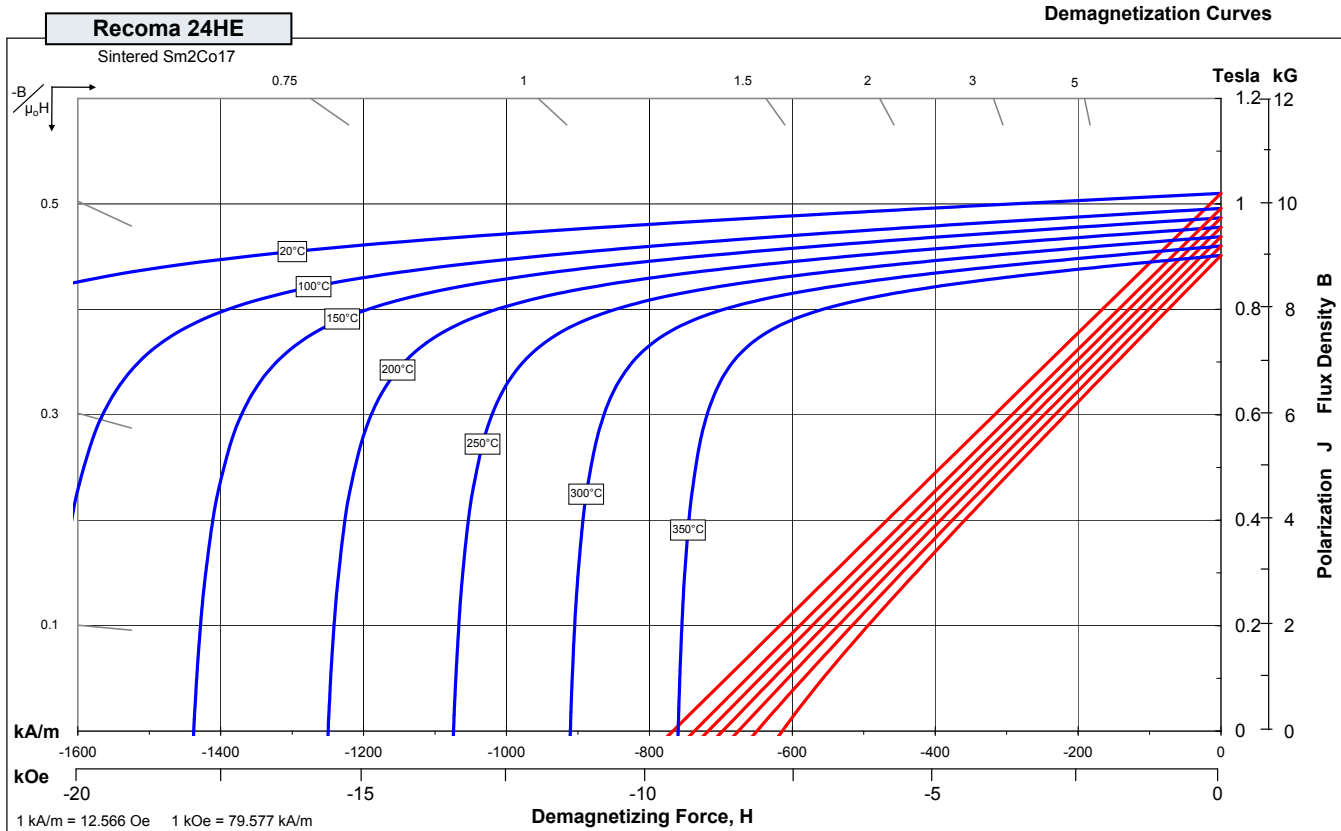
Recoma® Sintered Samarium Cobalt Magnets

These are also referred to as Rare Earth or SmCo magnets. The Recoma family of materials offer a combination of high magnetic output and excellent temperature stability. Please contact Arnold for additional grade information, application assistance and recommendations for protective coatings. Assemblies using these magnets can also be provided.

Magnetic Properties	Characteristic	Units	min.	nominal
	Br , Residual Induction		Gauss	9,700
		Tesla	0.97	1.02
H_{CB} , Coercivity		Oersteds	8,980	9,610
		kA/m	715	765
H_{CJ} , Intrinsic Coercivity		Oersteds	19,000	25,000
		kA/m	1,500	2,000
BHmax , Maximum Energy Product		MGOe	22	25
		kJ/m ³	175	195

Thermal Properties	Characteristic	Units	C //	C ⊥
	Reversible Temperature Coefficients ⁽¹⁾	of Induction, α(Br)	%/°C	
of Coercivity, α(H _{Cj})		%/°C		-0.212
Coefficient of Thermal Expansion ⁽²⁾		ΔL/L per °C×10 ⁻⁶	11	13
	Thermal Conductivity	W/(m·K)		10
	Specific Heat ⁽³⁾	J/(kg·K)		350
	Max. Recommended Use Temperature	°C		350
	Curie Temperature, T _c	°C		825
Other Properties	Flexural Strength	psi		17,400
		MPa		120
	Compressive Strength	psi		116,000
		MPa		800
	Young's Modulus	GPa		140
	Density	g/cm ³		8.4
	Hardness, Vickers	Hv		600
Electrical Resistivity, ρ	μΩ · cm		90	

Notes: (1) Coefficients measured between 20 and 150 °C
 (2) Between 20 and 200 °C (3) Between 20 and 150 °C



Notes The material data and demagnetization curves shown above represent typical properties that may vary due to product shape and size. Demagnetization curves show nominal Br and H_{Cj}. Magnets can be supplied thermally stabilized or magnetically calibrated to customer specifications. Additional grades are available. Please contact the factory for information.

Dimensions and shape of the magnet, in combination with required manufacturing processes, may cause the magnetic and physical characteristics to vary from typical values. Therefore, all data presented in this document are for general reference only and should not be relied upon to represent standard characteristics, nor are they guaranteed upon use. Arnold Magnetic Technologies reserves the right to change information in this document, including magnet performance standards, specifications, and characteristics without notice.

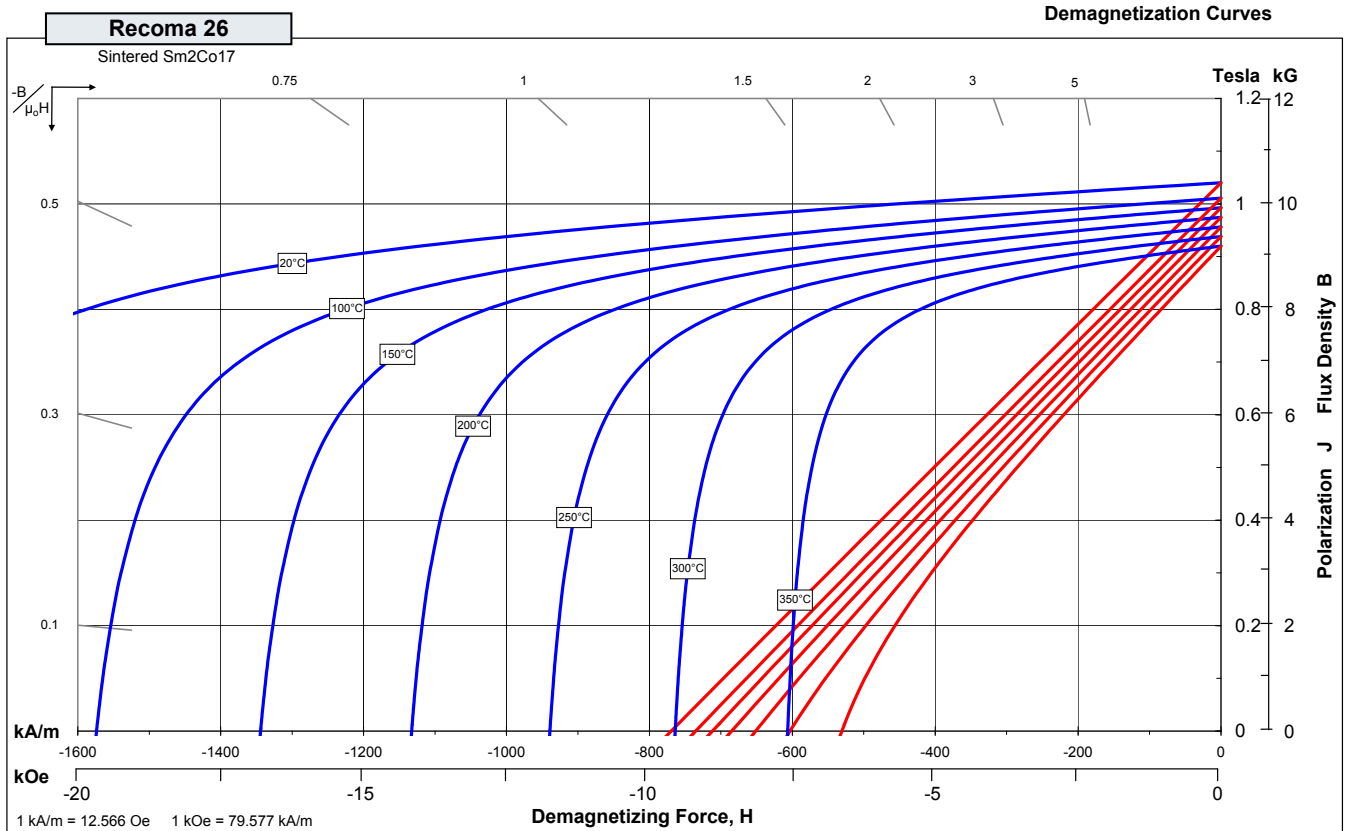
Recoma® Sintered Samarium Cobalt Magnets

These are also referred to as Rare Earth or SmCo magnets. The Recoma family of materials offer a combination of high magnetic output and excellent temperature stability. Please contact Arnold for additional grade information, application assistance and recommendations for protective coatings. Assemblies using these magnets can also be provided.

Characteristic	Units	Magnetic Properties	
		min.	nominal
Br , Residual Induction	Gauss	10,000	10,400
	Tesla	1.00	1.04
H_{CB} , Coercivity	Oersteds	8,550	9,610
	kA/m	680	765
H_{cJ} , Intrinsic Coercivity	Oersteds	15,000	25,000
	kA/m	1,200	2,000
BHmax , Maximum Energy Product	MGOe	23	26
	kJ/m ³	185	205

Characteristic	Units	Other Properties		
		C //	C ⊥	
Thermal Properties	Reversible Temperature Coefficients ⁽¹⁾			
	of Induction, α(Br)	%/°C	-0.035	
	of Coercivity, α(H _{cj})	%/°C	-0.247	
	Coefficient of Thermal Expansion ⁽²⁾	ΔL/L per °C×10 ⁻⁶	11	13
	Thermal Conductivity	W/(m·K)	10	
	Specific Heat ⁽³⁾	J/(kg·K)	350	
Max. Recommended Use Temperature	°C	350		
Curie Temperature, T _c	°C	825		
Other Properties	Flexural Strength	psi	17,400	
		MPa	120	
	Compressive Strength	psi	116,000	
		MPa	800	
	Young's Modulus	GPa	140	
	Density	g/cm ³	8.3	
	Hardness, Vickers	Hv	600	
Electrical Resistivity, ρ	μΩ · cm	90		

Notes: (1) Coefficients measured between 20 and 150 °C
 (2) Between 20 and 200 °C (3) Between 20 and 150 °C



Notes The material data and demagnetization curves shown above represent typical properties that may vary due to product shape and size. Demagnetization curves show nominal Br and H_{cj}. Magnets can be supplied thermally stabilized or magnetically calibrated to customer specifications. Additional grades are available. Please contact the factory for information.

Dimensions and shape of the magnet, in combination with required manufacturing processes, may cause the magnetic and physical characteristics to vary from typical values. Therefore, all data presented in this document are for general reference only and should not be relied upon to represent standard characteristics, nor are they guaranteed upon use. Arnold Magnetic Technologies reserves the right to change information in this document, including magnet performance standards, specifications, and characteristics without notice.

Recoma 26HE

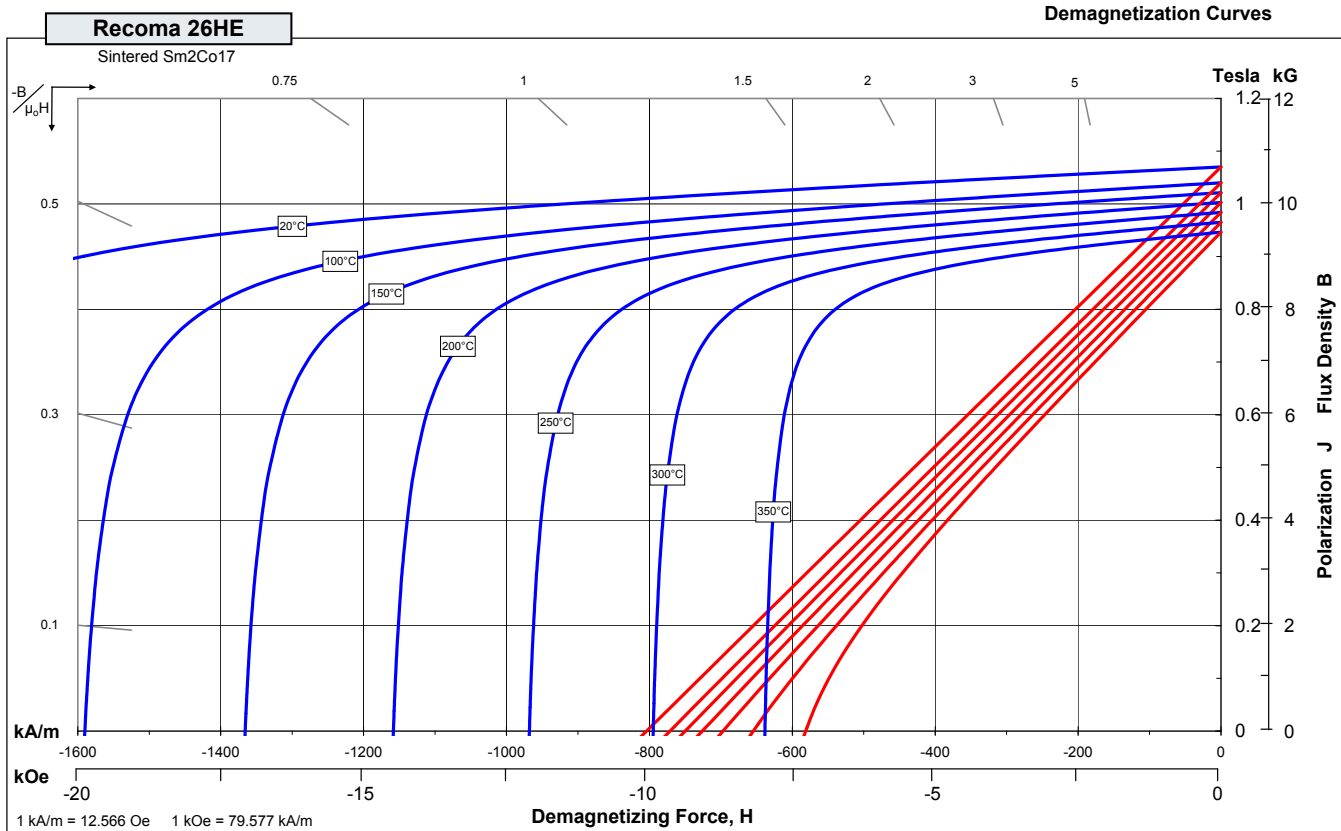
Recoma® Sintered Samarium Cobalt Magnets

These are also referred to as Rare Earth or SmCo magnets. The Recoma family of materials offer a combination of high magnetic output and excellent temperature stability. Please contact Arnold for additional grade information, application assistance and recommendations for protective coatings. Assemblies using these magnets can also be provided.

Characteristic	Units	Magnetic Properties	
		min.	nominal
Br , Residual Induction	Gauss	10,300	10,700
	Tesla	1.03	1.07
H_{CB} , Coercivity	Oersteds	9,490	10,050
	kA/m	755	800
H_{cJ} , Intrinsic Coercivity	Oersteds	19,000	25,000
	kA/m	1,500	2,000
BH_{max} , Maximum Energy Product	MGOe	25	27
	kJ/m ³	195	215

Characteristic	Units	C // C ⊥		
		C //	C ⊥	
Thermal Properties	Reversible Temperature Coefficients ⁽¹⁾			
	of Induction, α(Br)	%/°C	-0.035	
	of Coercivity, α(H _{cj})	%/°C	-0.24	
	Coefficient of Thermal Expansion ⁽²⁾	ΔL/L per °C×10 ⁻⁶	11	13
	Thermal Conductivity	W/(m·K)	10	
	Specific Heat ⁽³⁾	J/(kg·K)	350	
Max. Recommended Use Temperature	°C	350		
Curie Temperature, T _c	°C	825		
Other Properties	Flexural Strength	psi	17,400	
		MPa	120	
	Compressive Strength	psi	116,000	
		MPa	800	
	Young's Modulus	GPa	140	
	Density	g/cm ³	8.4	
	Hardness, Vickers	Hv	600	
Electrical Resistivity, ρ	μΩ · cm	90		

Notes: (1) Coefficients measured between 20 and 150 °C
 (2) Between 20 and 200 °C (3) Between 20 and 150 °C



Notes The material data and demagnetization curves shown above represent typical properties that may vary due to product shape and size. Demagnetization curves show nominal Br and H_{cj}. Magnets can be supplied thermally stabilized or magnetically calibrated to customer specifications. Additional grades are available. Please contact the factory for information.

Dimensions and shape of the magnet, in combination with required manufacturing processes, may cause the magnetic and physical characteristics to vary from typical values. Therefore, all data presented in this document are for general reference only and should not be relied upon to represent standard characteristics, nor are they guaranteed upon use. Arnold Magnetic Technologies reserves the right to change information in this document, including magnet performance standards, specifications, and characteristics without notice.

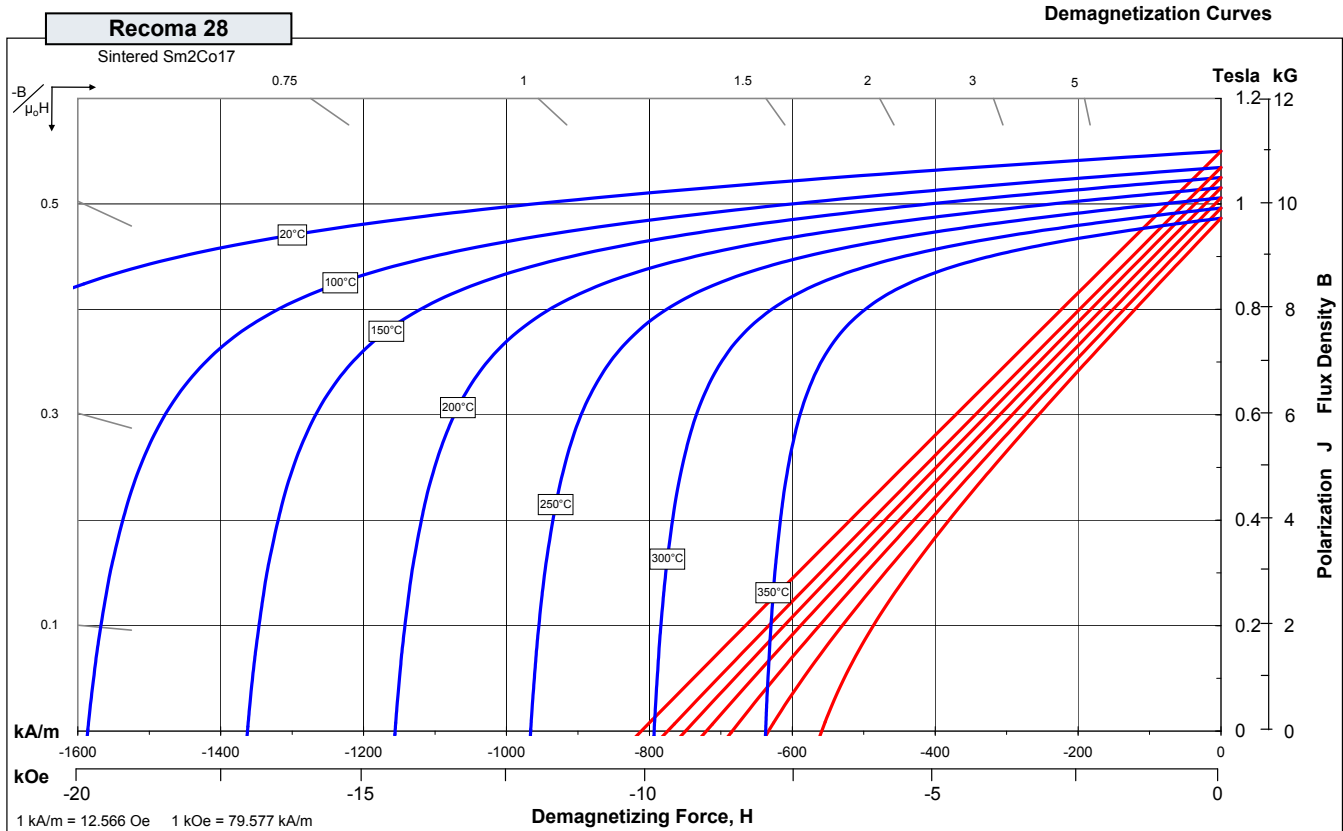
Recoma® Sintered Samarium Cobalt Magnets

These are also referred to as Rare Earth or SmCo magnets. The Recoma family of materials offer a combination of high magnetic output and excellent temperature stability. Please contact Arnold for additional grade information, application assistance and recommendations for protective coatings. Assemblies using these magnets can also be provided.

Characteristic	Units	Magnetic Properties	
		min.	nominal
Br , Residual Induction	Gauss	10,400	11,000
	Tesla	1.04	1.10
H_{CB} , Coercivity	Oersteds	8,800	10,050
	kA/m	700	800
H_{cJ} , Intrinsic Coercivity	Oersteds	15,000	25,000
	kA/m	1,200	2,000
BHmax , Maximum Energy Product	MGOe	25	28
	kJ/m ³	195	225

Characteristic	Units	C // C ⊥		
		C //	C ⊥	
Thermal Properties	Reversible Temperature Coefficients ⁽¹⁾			
	of Induction, α(Br)	%/°C	-0.035	
	of Coercivity, α(H _{cj})	%/°C	-0.24	
	Coefficient of Thermal Expansion ⁽²⁾	ΔL/L per °C×10 ⁻⁶	11	13
	Thermal Conductivity	W/(m·K)	10	
	Specific Heat ⁽³⁾	J/(kg·K)	350	
Max. Recommended Use Temperature	°C	350		
Curie Temperature, T _c	°C	825		
Other Properties	Flexural Strength	psi	17,400	
		MPa	120	
	Compressive Strength	psi	116,000	
		MPa	800	
	Young's Modulus	GPa	140	
	Density	g/cm ³	8.3	
	Hardness, Vickers	Hv	600	
Electrical Resistivity, ρ	μΩ · cm	90		

Notes: (1) Coefficients measured between 20 and 150 °C
 (2) Between 20 and 200 °C (3) Between 20 and 150 °C



Notes The material data and demagnetization curves shown above represent typical properties that may vary due to product shape and size. Demagnetization curves show nominal Br and H_{cj}. Magnets can be supplied thermally stabilized or magnetically calibrated to customer specifications. Additional grades are available. Please contact the factory for information.

Dimensions and shape of the magnet, in combination with required manufacturing processes, may cause the magnetic and physical characteristics to vary from typical values. Therefore, all data presented in this document are for general reference only and should not be relied upon to represent standard characteristics, nor are they guaranteed upon use. Arnold Magnetic Technologies reserves the right to change information in this document, including magnet performance standards, specifications, and characteristics without notice.

Recoma 28HE

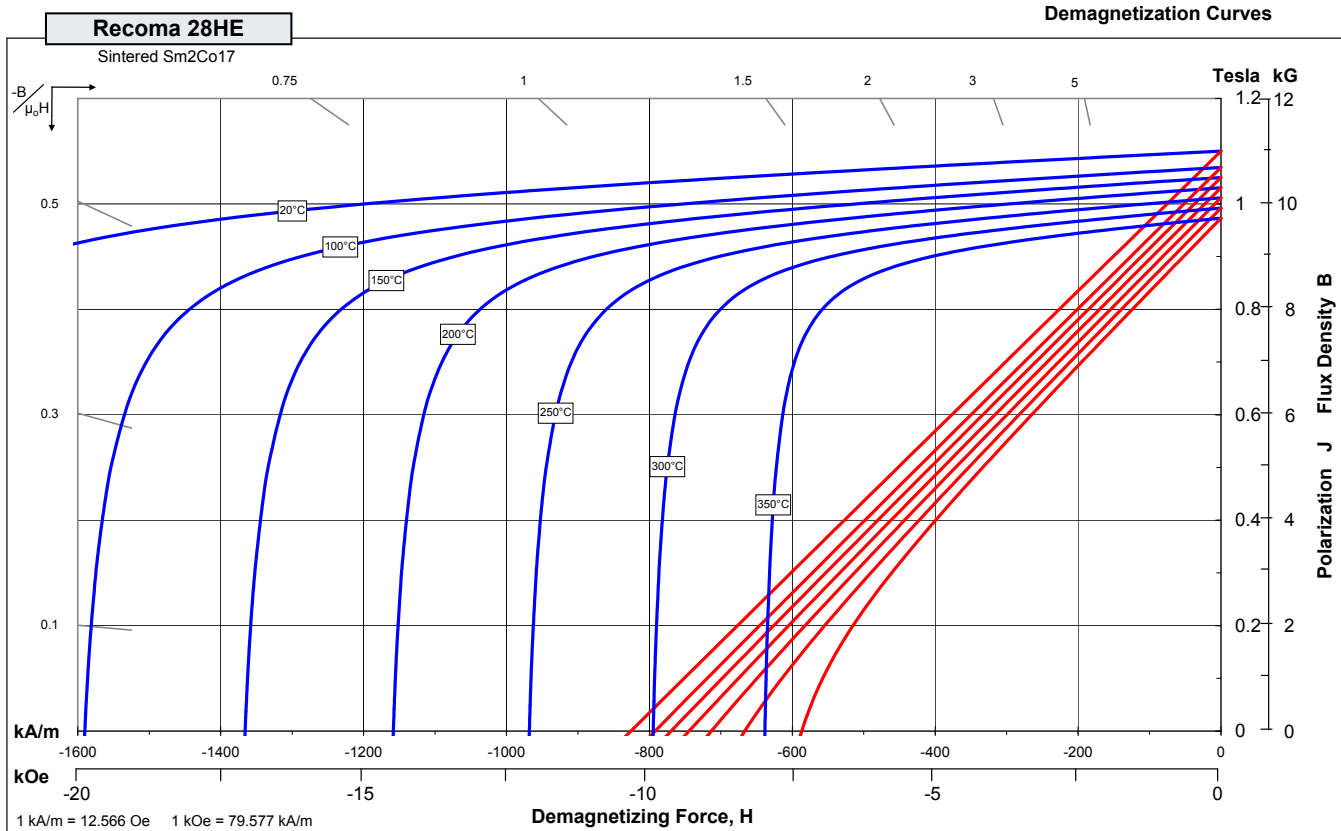
Recoma® Sintered Samarium Cobalt Magnets

These are also referred to as Rare Earth or SmCo magnets. The Recoma family of materials offer a combination of high magnetic output and excellent temperature stability. Please contact Arnold for additional grade information, application assistance and recommendations for protective coatings. Assemblies using these magnets can also be provided.

Magnetic Properties	Characteristic	Units	min.	nominal
	Br , Residual Induction		Gauss	10,600
		Tesla	1.06	1.10
H_{CB} , Coercivity		Oersteds	9,740	10,120
		kA/m	775	805
H_{cJ} , Intrinsic Coercivity		Oersteds	19,000	25,000
		kA/m	1,500	2,000
BH_{max} , Maximum Energy Product		MGOe	27	28
		kJ/m ³	215	225

Characteristic	Units	C // C ⊥		
Thermal Properties	Reversible Temperature Coefficients ⁽¹⁾			
	of Induction, α(Br)	%/°C	-0.035	
	of Coercivity, α(H _{cj})	%/°C	-0.24	
	Coefficient of Thermal Expansion ⁽²⁾	ΔL/L per °C×10 ⁻⁶	11	13
	Thermal Conductivity	W/(m·K)	10	
	Specific Heat ⁽³⁾	J/(kg·K)	350	
Max. Recommended Use Temperature	°C	350		
Curie Temperature, T _c	°C	825		
Other Properties	Flexural Strength	psi	17,400	
		MPa	120	
	Compressive Strength	psi	116,000	
		MPa	800	
	Young's Modulus	GPa	140	
	Density	g/cm ³	8.4	
	Hardness, Vickers	Hv	600	
Electrical Resistivity, ρ	μΩ · cm	90		

Notes: (1) Coefficients measured between 20 and 150 °C
 (2) Between 20 and 200 °C (3) Between 20 and 150 °C



Notes The material data and demagnetization curves shown above represent typical properties that may vary due to product shape and size. Demagnetization curves show nominal Br and H_{cj}. Magnets can be supplied thermally stabilized or magnetically calibrated to customer specifications. Additional grades are available. Please contact the factory for information.

Dimensions and shape of the magnet, in combination with required manufacturing processes, may cause the magnetic and physical characteristics to vary from typical values. Therefore, all data presented in this document are for general reference only and should not be relied upon to represent standard characteristics, nor are they guaranteed upon use. Arnold Magnetic Technologies reserves the right to change information in this document, including magnet performance standards, specifications, and characteristics without notice.

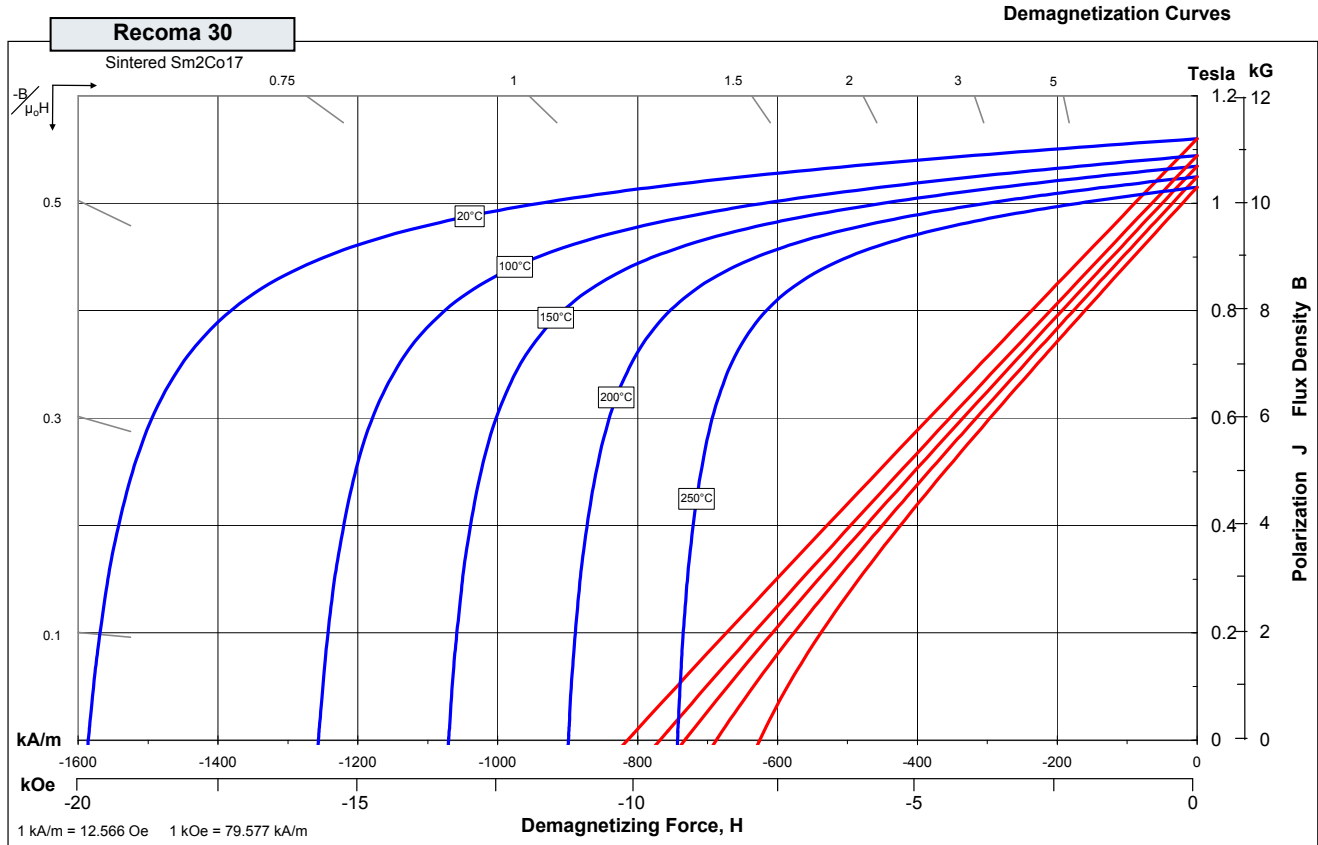
Recoma® Sintered Samarium Cobalt Magnets

These are also referred to as Rare Earth or SmCo magnets. The Recoma family of materials offer a combination of high magnetic output and excellent temperature stability. Please contact Arnold for additional grade information, application assistance and recommendations for protective coatings. Assemblies using these magnets can also be provided.

Characteristic	Units	Magnetic Properties	
		min.	nominal
Br , Residual Induction	Gauss	10,900	11,200
	Tesla	1.09	1.12
H_{CB} , Coercivity	Oersteds	8,800	10,300
	kA/m	700	820
H_{CJ} , Intrinsic Coercivity	Oersteds	13,000	20,000
	kA/m	1,040	1,600
BH_{max} , Maximum Energy Product	MGOe	27	29
	kJ/m ³	215	230

Characteristic	Units	Thermal Properties	
		C //	C ⊥
Reversible Temperature Coefficients ⁽¹⁾			
of Induction, α(Br)	%/°C		-0.035
of Coercivity, α(H _{Cj})	%/°C		-0.25
Coefficient of Thermal Expansion ⁽²⁾	ΔL/L per °C x 10 ⁻⁶	11	13
Thermal Conductivity	W/(m·K)		10
Specific Heat ⁽³⁾	J/(kg·K)		350
Max. Recommended Use Temperature	°C		250
Curie Temperature, T _c	°C		825
Other Properties	Flexural Strength	psi	17,400
		MPa	120
	Compressive Strength	psi	116,000
		MPa	800
	Young's Modulus	GPa	140
	Density	g/cm ³	8.3
	Hardness, Vickers	Hv	600
Electrical Resistivity, ρ	μΩ · cm	90	

Notes: (1) Coefficients measured between 20 and 150 °C
 (2) Between 20 and 200 °C (3) Between 20 and 150 °C



Notes The material data and demagnetization curves shown above represent typical properties that may vary due to product shape and size. Demagnetization curves show nominal Br and H_{Cj}. Magnets can be supplied thermally stabilized or magnetically calibrated to customer specifications. Additional grades are available. Please contact the factory for information.

Dimensions and shape of the magnet, in combination with required manufacturing processes, may cause the magnetic and physical characteristics to vary from typical values. Therefore, all data presented in this document are for general reference only and should not be relied upon to represent standard characteristics, nor are they guaranteed upon use. Arnold Magnetic Technologies reserves the right to change information in this document, including magnet performance standards, specifications, and characteristics without notice.

Recoma 30HE

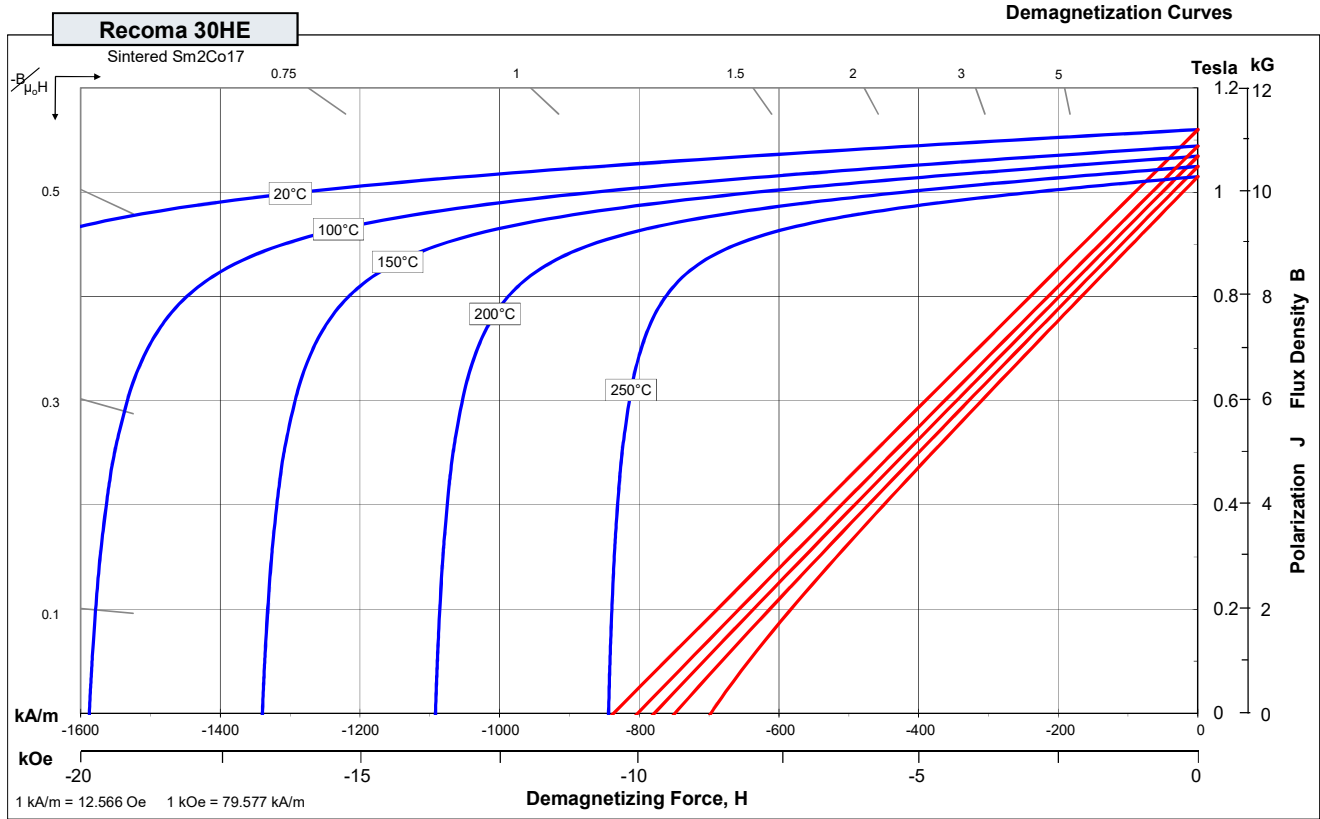
Recoma® Sintered Samarium Cobalt Magnets

These are also referred to as Rare Earth or SmCo magnets. The Recoma family of materials offer a combination of high magnetic output and excellent temperature stability. Please contact Arnold for additional grade information, application assistance and recommendations for protective coatings. Assemblies using these magnets can also be provided.

Magnetic Properties	Characteristic	Units	min.	nominal
	Br , Residual Induction		Gauss	10,900
		Tesla	1.09	1.12
H_{cB} , Coercivity		Oersteds	9,990	10,430
		kA/m	795	830
H_{cJ} , Intrinsic Coercivity		Oersteds	19,000	25,000
		kA/m	1,500	2,000
BH_{max} , Maximum Energy Product		MGOe	27	29
		kJ/m ³	215	230

Thermal Properties	Characteristic	Units	C //	C ⊥	
	Thermal Properties	Reversible Temperature Coefficients ⁽¹⁾			
of Induction, α(Br)		%/°C		-0.035	
of Coercivity, α(H _{cj})		%/°C		-0.25	
Coefficient of Thermal Expansion ⁽²⁾		ΔL/L per °C×10 ⁻⁶	11	13	
Thermal Conductivity		W/(m·K)		10	
Other Properties	Specific Heat ⁽³⁾	J/(kg·K)		350	
	Max. Recommended Use Temperature	°C		350	
	Curie Temperature, T _c	°C		825	
	Flexural Strength		psi		17,400
			MPa		120
	Compressive Strength		psi		116,000
			MPa		800
	Young's Modulus	GPa		140	
	Density	g/cm ³		8.3	
	Hardness, Vickers	Hv		600	
Electrical Resistivity, ρ	μΩ · cm		90		

Notes: (1) Coefficients measured between 20 and 150 °C
 (2) Between 20 and 200 °C (3) Between 20 and 150 °C



Notes The material data and demagnetization curves shown above represent typical properties that may vary due to product shape and size. Demagnetization curves show nominal Br and H_{cj}. Magnets can be supplied thermally stabilized or magnetically calibrated to customer specifications. Additional grades are available. Please contact the factory for information.

Dimensions and shape of the magnet, in combination with required manufacturing processes, may cause the magnetic and physical characteristics to vary from typical values. Therefore, all data presented in this document are for general reference only and should not be relied upon to represent standard characteristics, nor are they guaranteed upon use. Arnold Magnetic Technologies reserves the right to change information in this document, including magnet performance standards, specifications, and characteristics without notice.

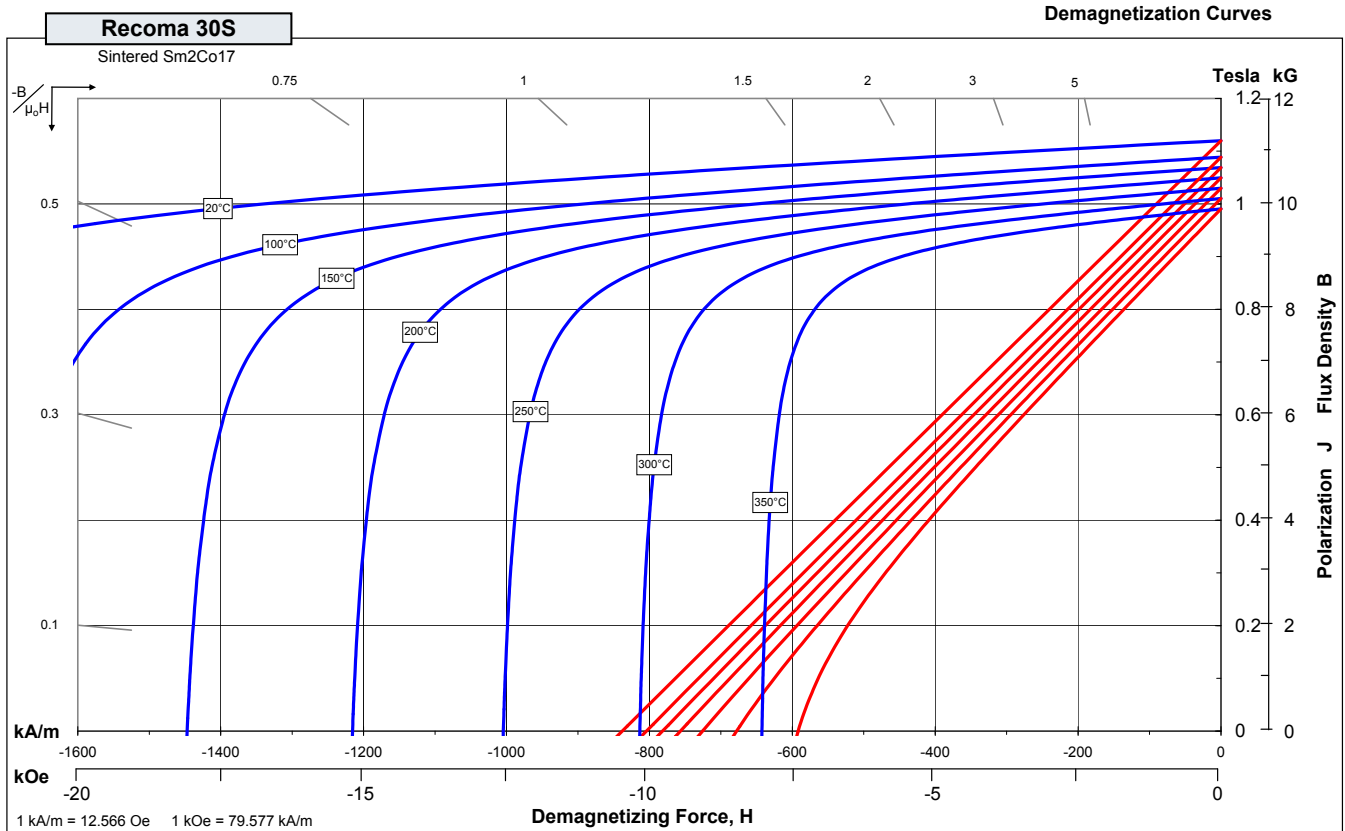
Recoma® Sintered Samarium Cobalt Magnets

These are also referred to as Rare Earth or SmCo magnets. The Recoma family of materials offer a combination of high magnetic output and excellent temperature stability. Please contact Arnold for additional grade information, application assistance and recommendations for protective coatings. Assemblies using these magnets can also be provided.

Magnetic Properties	Characteristic	Units	min.	nominal
	Br , Residual Induction		Gauss	10,900
		Tesla	1.09	1.12
H_{CB} , Coercivity		Oersteds	10,300	10,620
		kA/m	820	845
H_{cJ} , Intrinsic Coercivity		Oersteds	22,000	27,000
		kA/m	1,750	2,150
BHmax , Maximum Energy Product		MGOe	28	30
		kJ/m ³	225	235

Thermal Properties	Characteristic	Units	C //	C ⊥
	Reversible Temperature Coefficients ⁽¹⁾	of Induction, α(Br)	%/°C	
of Coercivity, α(H _{cj})		%/°C		-0.25
Coefficient of Thermal Expansion ⁽²⁾		ΔL/L per °C×10 ⁻⁶	11	13
Thermal Conductivity		W/(m·K)		10
Specific Heat ⁽³⁾		J/(kg·K)		350
Max. Recommended Use Temperature		°C		350
Curie Temperature, T _c		°C		825
Other Properties	Flexural Strength		psi	17,400
			MPa	120
	Compressive Strength		psi	116,000
			MPa	800
	Young's Modulus		GPa	140
	Density		g/cm ³	8.3
	Hardness, Vickers		Hv	600
Electrical Resistivity, ρ		μΩ · cm	90	

Notes: (1) Coefficients measured between 20 and 150 °C
 (2) Between 20 and 200 °C (3) Between 20 and 150 °C



Notes The material data and demagnetization curves shown above represent typical properties that may vary due to product shape and size. Demagnetization curves show nominal Br and H_{cj}. Magnets can be supplied thermally stabilized or magnetically calibrated to customer specifications. Additional grades are available. Please contact the factory for information.

Dimensions and shape of the magnet, in combination with required manufacturing processes, may cause the magnetic and physical characteristics to vary from typical values. Therefore, all data presented in this document are for general reference only and should not be relied upon to represent standard characteristics, nor are they guaranteed upon use. Arnold Magnetic Technologies reserves the right to change information in this document, including magnet performance standards, specifications, and characteristics without notice.

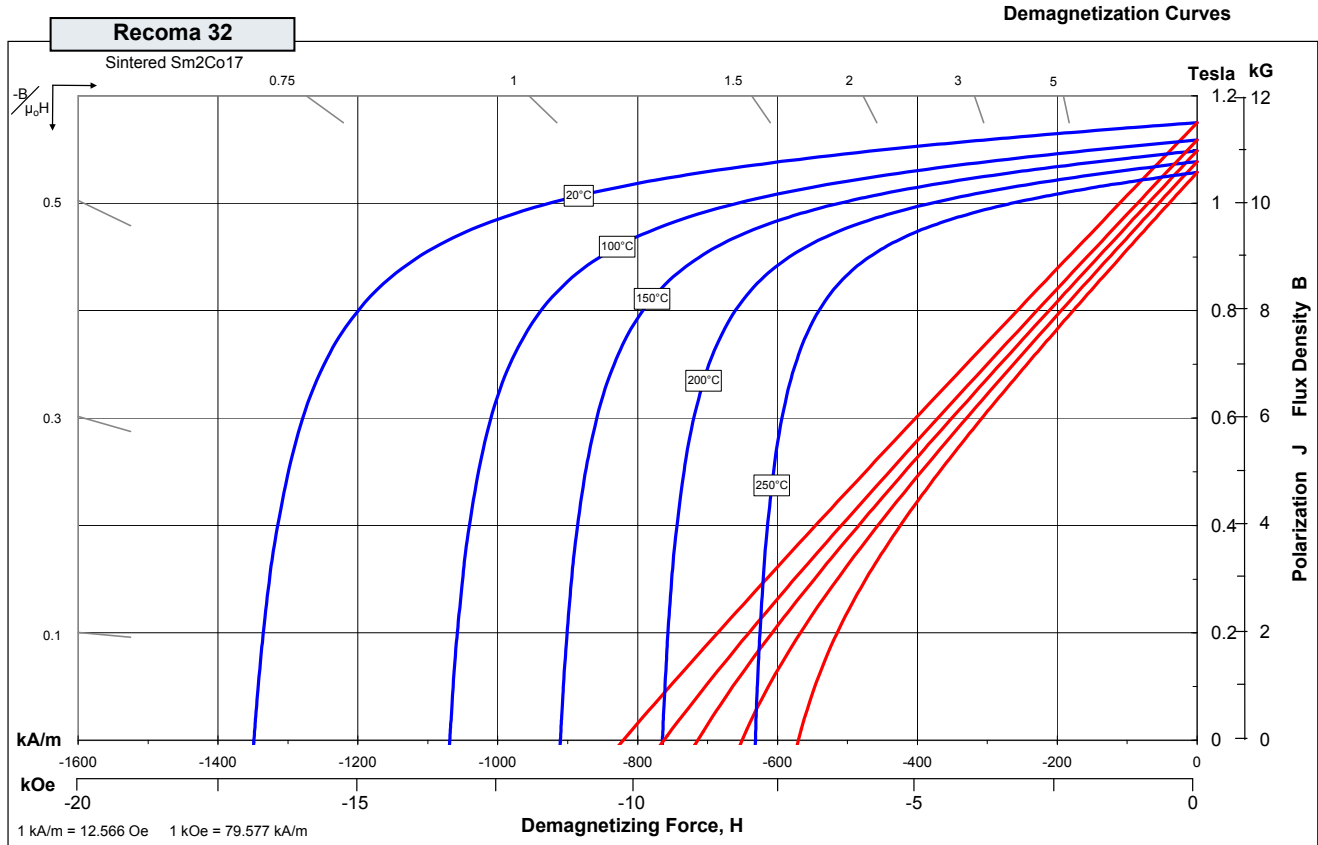
Recoma® Sintered Samarium Cobalt Magnets

These are also referred to as Rare Earth or SmCo magnets. The Recoma family of materials offer a combination of high magnetic output and excellent temperature stability. Please contact Arnold for additional grade information, application assistance and recommendations for protective coatings. Assemblies using these magnets can also be provided.

Characteristic	Units	Magnetic Properties	
		min.	nominal
Br , Residual Induction	Gauss	11,200	11,500
	Tesla	1.12	1.15
H_{CB} , Coercivity	Oersteds	8,040	10,490
	kA/m	640	835
H_{CJ} , Intrinsic Coercivity	Oersteds	13,000	17,000
	kA/m	1,040	1,350
BH_{max} , Maximum Energy Product	MGOe	28	30
	kJ/m ³	225	240

Characteristic	Units	Thermal Properties	
		C //	C ⊥
Reversible Temperature Coefficients ⁽¹⁾	of Induction, α(Br)	%/°C	-0.035
	of Coercivity, α(H _{Cj})	%/°C	-0.25
	Coefficient of Thermal Expansion ⁽²⁾	ΔL/L per °Cx10 ⁻⁶	11
Thermal Conductivity	W/(m·K)	10	
Specific Heat ⁽³⁾	J/(kg·K)	350	
Max. Recommended Use Temperature	°C	250	
Curie Temperature, T _c	°C	825	
Other Properties	Flexural Strength	psi	17,400
		MPa	120
	Compressive Strength	psi	116,000
		MPa	800
	Young's Modulus	GPa	140
	Density	g/cm ³	8.3
	Hardness, Vickers	Hv	600
Electrical Resistivity, ρ	μΩ · cm	90	

Notes: (1) Coefficients measured between 20 and 150 °C
 (2) Between 20 and 200 °C (3) Between 20 and 150 °C



Notes The material data and demagnetization curves shown above represent typical properties that may vary due to product shape and size. Demagnetization curves show nominal Br and H_{Cj}. Magnets can be supplied thermally stabilized or magnetically calibrated to customer specifications. Additional grades are available. Please contact the factory for information.

Dimensions and shape of the magnet, in combination with required manufacturing processes, may cause the magnetic and physical characteristics to vary from typical values. Therefore, all data presented in this document are for general reference only and should not be relied upon to represent standard characteristics, nor are they guaranteed upon use. Arnold Magnetic Technologies reserves the right to change information in this document, including magnet performance standards, specifications, and characteristics without notice.

Recoma 32S

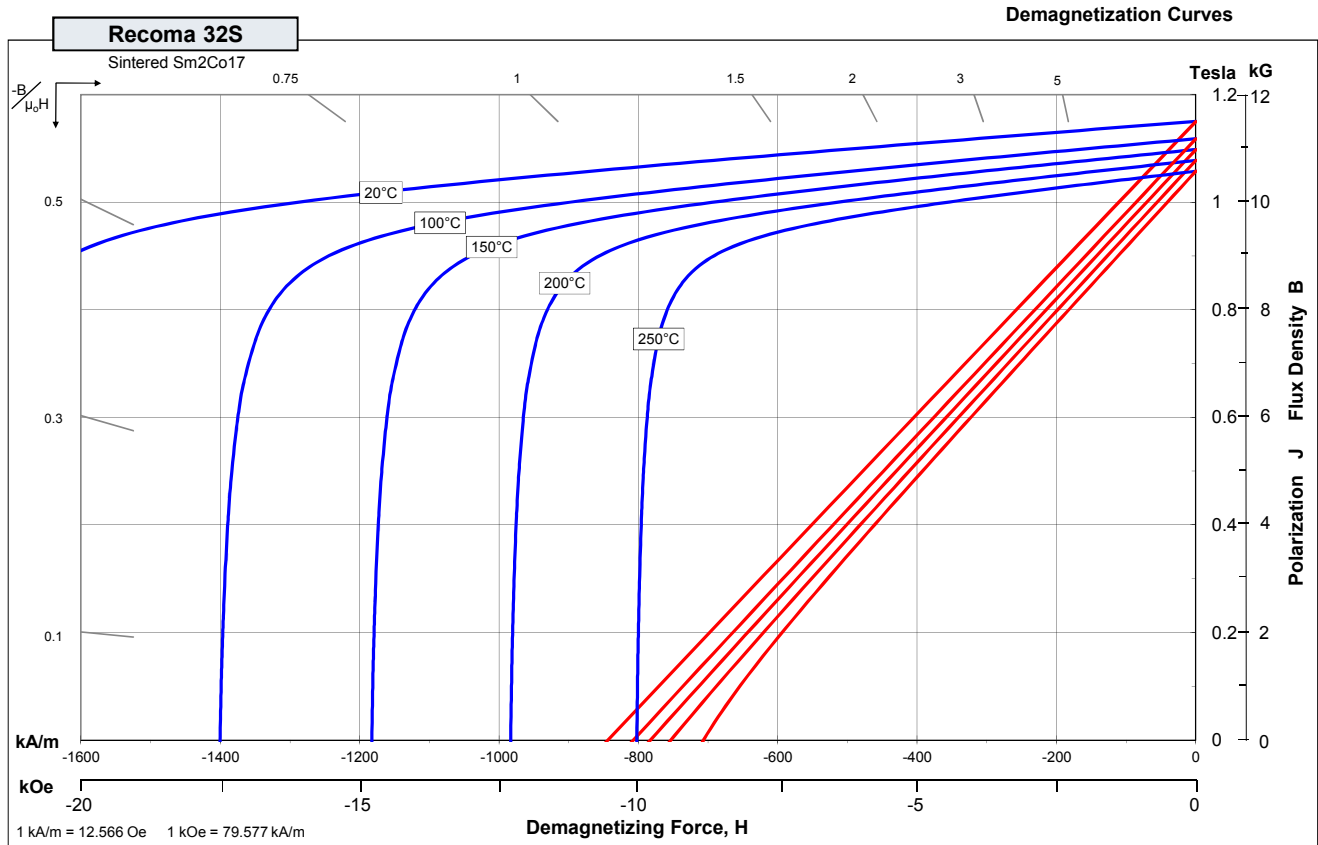
Recoma® Sintered Samarium Cobalt Magnets

These are also referred to as Rare Earth or SmCo magnets. The Recoma family of materials offer a combination of high magnetic output and excellent temperature stability. Please contact Arnold for additional grade information, application assistance and recommendations for protective coatings. Assemblies using these magnets can also be provided.

Characteristic	Units	Magnetic Properties	
		min.	nominal
Br , Residual Induction	Gauss	11,200	11,500
	Tesla	1.12	1.15
H_{CB} , Coercivity	Oersteds	9,800	10,680
	kA/m	780	850
H_{CJ} , Intrinsic Coercivity	Oersteds	20,000	22,500
	kA/m	1,590	1,790
BH_{max} , Maximum Energy Product	MGOe	28	31
	kJ/m ³	223	245

Characteristic	Units	Thermal Properties	
		C //	C ⊥
Reversible Temperature Coefficients ⁽¹⁾	of Induction, α(Br)	%/°C	-0.035
	of Coercivity, α(H _{Cj})	%/°C	-0.25
	Coefficient of Thermal Expansion ⁽²⁾	ΔL/L per °Cx10 ⁻⁶	11
Thermal Conductivity	W/(m·K)	10	
Specific Heat ⁽³⁾	J/(kg·K)	350	
Max. Recommended Use Temperature	°C	250	
Curie Temperature, T _c	°C	825	
Other Properties	Flexural Strength	psi	17,400
		MPa	120
	Compressive Strength	psi	116,000
		MPa	800
	Young's Modulus	GPa	140
	Density	g/cm ³	8.3
	Hardness, Vickers	Hv	600
Electrical Resistivity, ρ	μΩ · cm	90	

Notes: (1) Coefficients measured between 20 and 200 °C
 (2) Between 20 and 200 °C
 (3) Between 20 and 150 °C



Notes The material data and demagnetization curves shown above represent typical properties that may vary due to product shape and size. Demagnetization curves show nominal Br and H_{Cj}. Magnets can be supplied thermally stabilized or magnetically calibrated to customer specifications. Additional grades are available. Please contact the factory for information.

Dimensions and shape of the magnet, in combination with required manufacturing processes, may cause the magnetic and physical characteristics to vary from typical values. Therefore, all data presented in this document are for general reference only and should not be relied upon to represent standard characteristics, nor are they guaranteed upon use. Arnold Magnetic Technologies reserves the right to change information in this document, including magnet performance standards, specifications, and characteristics without notice.

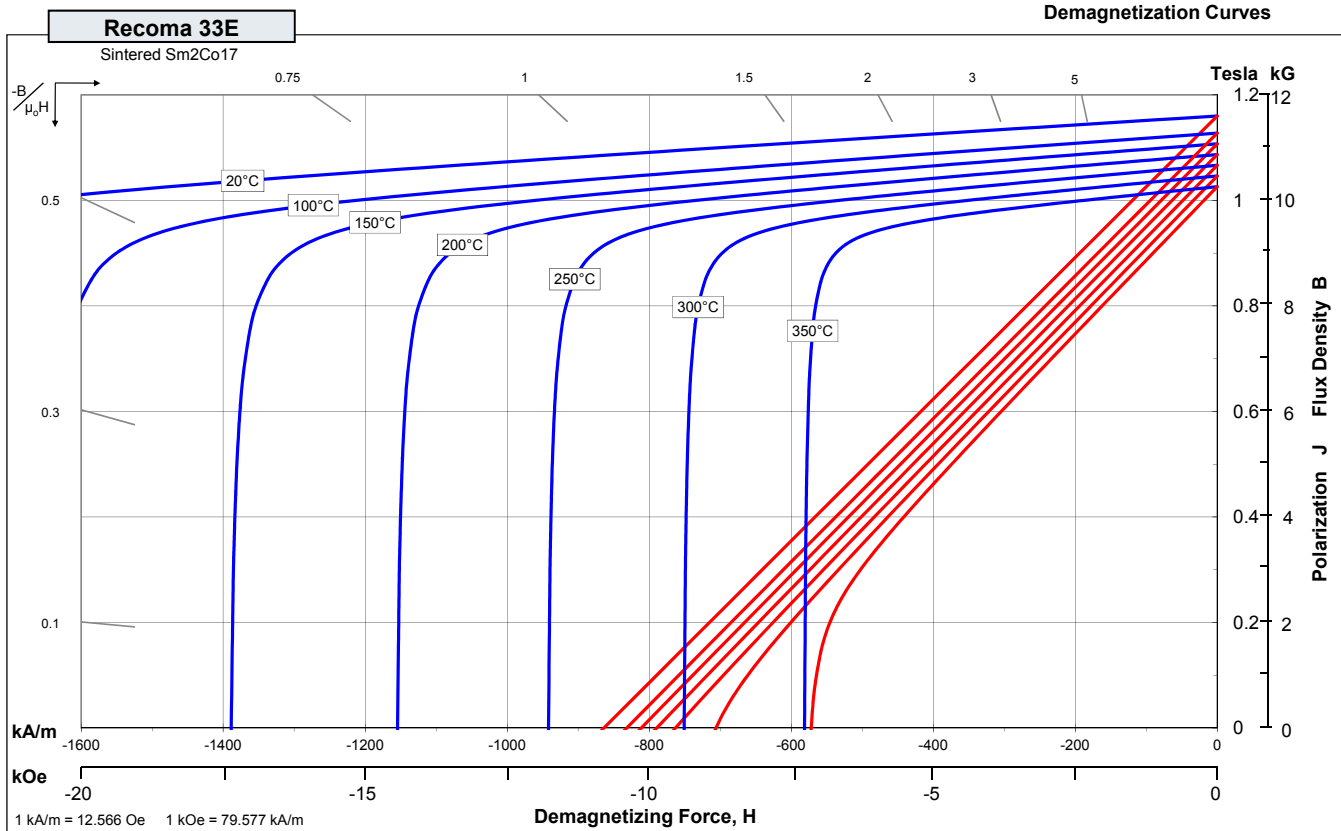
Recoma® Sintered Samarium Cobalt Magnets

These are also referred to as Rare Earth or SmCo magnets. The Recoma family of materials offer a combination of high magnetic output and excellent temperature stability. Please contact Arnold for additional grade information, application assistance and recommendations for protective coatings. Assemblies using these magnets can also be provided.

Magnetic Properties	Characteristic	Units	min.	nominal
	Br , Residual Induction		Gauss	11,400
		Tesla	1.14	1.16
H_{CB} , Coercivity		Oersteds	10,620	10,870
		kA/m	845	865
H_{CJ} , Intrinsic Coercivity		Oersteds	22,000	26,400
		kA/m	1,750	2,100
BH_{max} , Maximum Energy Product		MGOe	30	32
		kJ/m ³	238	251

Characteristic	Units	C // C ⊥		
Thermal Properties	Reversible Temperature Coefficients ⁽¹⁾			
	of Induction, α(Br)	%/°C	-0.035	
	of Coercivity, α(H _{Cj})	%/°C	-0.25	
	Coefficient of Thermal Expansion ⁽²⁾	ΔL/L per °C×10 ⁻⁶	11	13
	Thermal Conductivity	W/(m·K)	10	
	Specific Heat ⁽³⁾	J/(kg·K)	350	
Max. Recommended Use Temperature	°C	350		
Curie Temperature, T _c	°C	825		
Other Properties	Flexural Strength	psi	17,400	
		MPa	120	
	Compressive Strength	psi	116,000	
		MPa	800	
	Young's Modulus	GPa	140	
	Density	g/cm ³	8.3	
	Hardness, Vickers	Hv	600	
Electrical Resistivity, ρ	μΩ · cm	90		

Notes: (1) Coefficients measured between 20 and 200 °C
(2) Between 20 and 200 °C (3) Between 20 and 150 °C



Notes The material data and demagnetization curves shown above represent typical properties that may vary due to product shape and size. Demagnetization curves show nominal Br and H_{Cj}. Magnets can be supplied thermally stabilized or magnetically calibrated to customer specifications. Additional grades are available. Please contact the factory for information.

Dimensions and shape of the magnet, in combination with required manufacturing processes, may cause the magnetic and physical characteristics to vary from typical values. Therefore, all data presented in this document are for general reference only and should not be relied upon to represent standard characteristics, nor are they guaranteed upon use. Arnold Magnetic Technologies reserves the right to change information in this document, including magnet performance standards, specifications, and characteristics without notice.

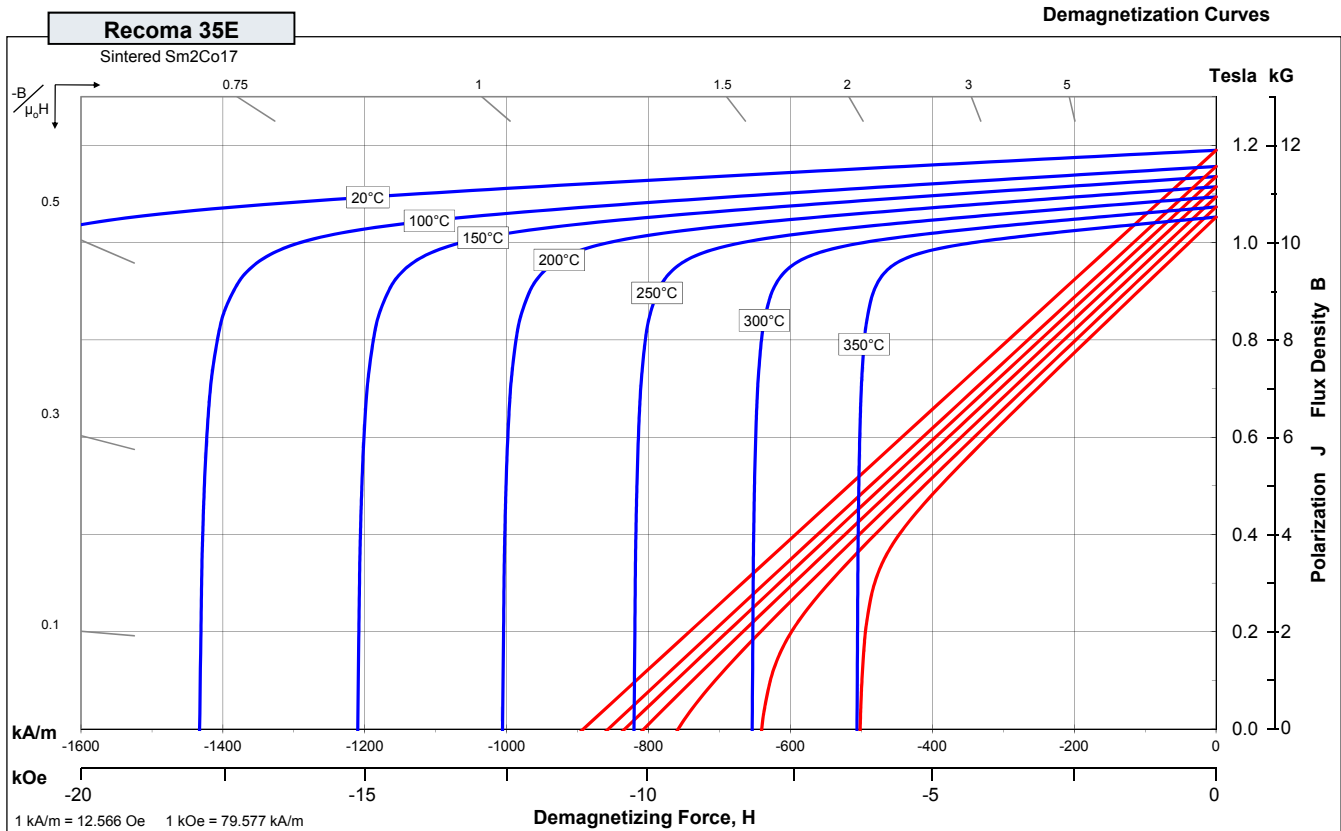
Recoma® Sintered Samarium Cobalt Magnets

These are also referred to as Rare Earth or SmCo magnets. The Recoma family of materials offer a combination of high magnetic output and excellent temperature stability. Please contact Arnold for additional grade information, application assistance and recommendations for protective coatings. Assemblies using these magnets can also be provided.

Magnetic Properties	Characteristic	Units	min.	nominal
	Br , Residual Induction		Gauss	11,700
		Tesla	1.170	1.190
H_{cB} , Coercivity		Oersteds	10,810	11,060
		kA/m	860	880
H_{cJ} , Intrinsic Coercivity		Oersteds	21,000	23,000
		kA/m	1,710	1,800
BH_{max} , Maximum Energy Product		MGOe	32.0	33.3
		kJ/m ³	255	265

Thermal Properties	Characteristic	Units	C //	C ⊥
	Reversible Temperature Coefficients ⁽¹⁾	of Induction, α(Br)	%/°C	
of Coercivity, α(H _{cj})		%/°C		-0.25
Coefficient of Thermal Expansion ⁽²⁾		ΔL/L per °C×10 ⁻⁶	11	13
	Thermal Conductivity	W/(m·K)		10
	Specific Heat ⁽³⁾	J/(kg·K)		350
	Max. Recommended Use Temperature	°C		300
	Curie Temperature, T _c	°C		820
Other Properties	Flexural Strength	psi		17,400
		MPa		120
	Compressive Strength	psi		116,000
		MPa		800
	Young's Modulus	GPa		140
	Density	Mg/m ³		8.3
	Hardness, Vickers	Hv		600
Electrical Resistivity, ρ	μΩ · cm		90	

Notes: (1) Coefficients measured between 20 and 200 °C
 (2) Between 20 and 200 °C (3) Between 20 and 150 °C



Notes The material data and demagnetization curves shown above represent typical properties that may vary due to product shape and size. Demagnetization curves show nominal Br and H_{cj}. Magnets can be supplied thermally stabilized or magnetically calibrated to customer specifications. Additional grades are available. Please contact the factory for information.

Dimensions and shape of the magnet, in combination with required manufacturing processes, may cause the magnetic and physical characteristics to vary from typical values. Therefore, all data presented in this document are for general reference only and should not be relied upon to represent standard characteristics, nor are they guaranteed upon use. Arnold Magnetic Technologies reserves the right to change information in this document, including magnet performance standards, specifications, and characteristics without notice.

Recoma STAB 02

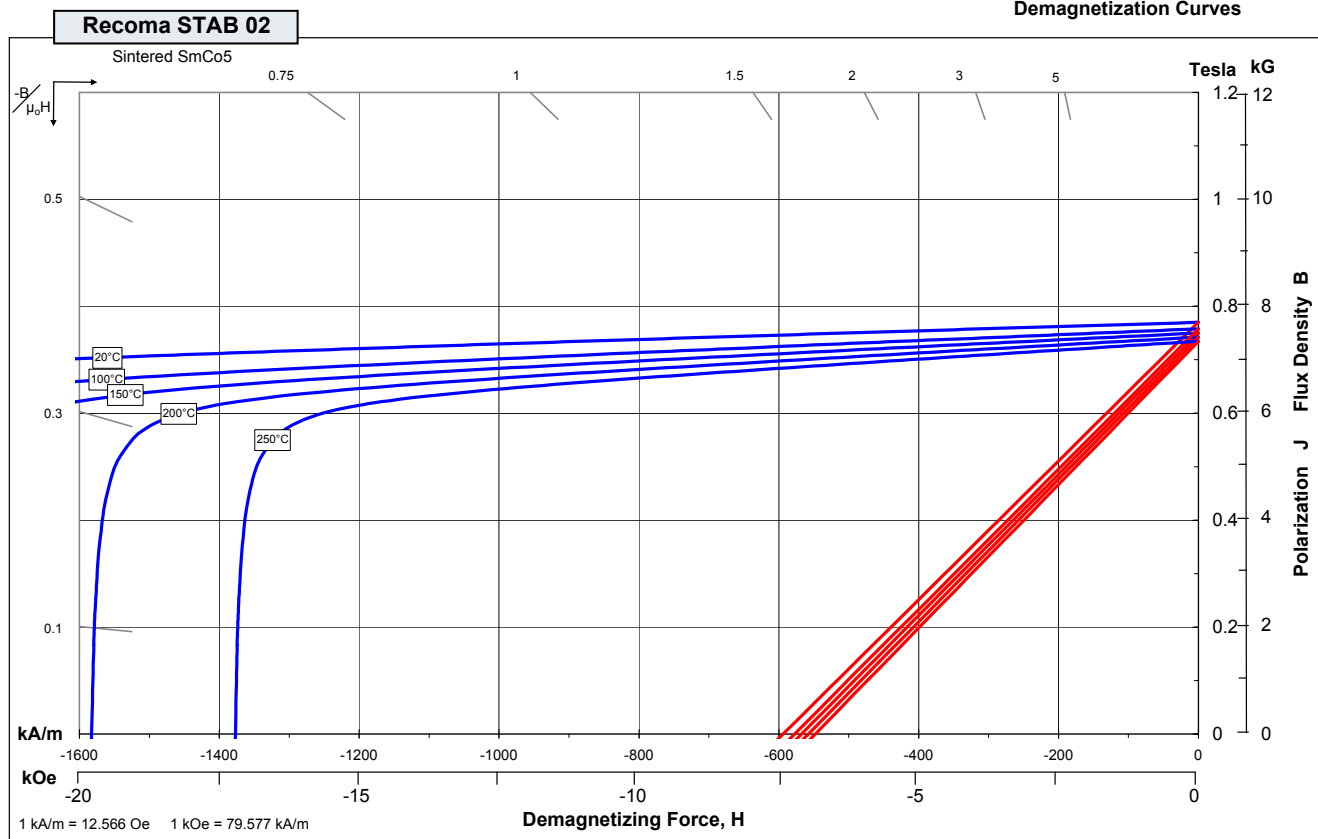
Recoma® Sintered Samarium Cobalt Magnets

The family of Recoma STAB magnets offer a combination of high magnetic output, excellent temperature stability. Grade STAB 02 is one of many in this family of temperature stabilized materials. STAB grades exhibit very low reversible temperature coefficients of induction suitable for such applications as TWTs, undulators and wigglers. Please contact Arnold for additional grade and application information.

Characteristic	Units	Magnetic Properties	
		min.	nominal
Br , Residual Induction	Gauss	7,300	7,700
	Tesla	0.73	0.77
H_{CB} , Coercivity	Oersteds	6,850	7,540
	kA/m	545	600
H_{CJ} , Intrinsic Coercivity	Oersteds	25,000	30,000
	kA/m	2,000	2,400
BH_{max} , Maximum Energy Product	MGOe	13	15
	kJ/m ³	100	115

Characteristic	Units	Other Properties		
		C //	C ⊥	
Thermal Properties	Reversible Temperature Coefficients ⁽¹⁾			
	of Induction, α(Br)	%/°C	-0.02	
	of Coercivity, α(H _{Cj})	%/°C	-0.19	
	Coefficient of Thermal Expansion ⁽²⁾	ΔL/L per °C x 10 ⁻⁶	7	14
	Thermal Conductivity	W/(m·K)	11	
	Specific Heat ⁽³⁾	J/(kg·K)	370	
Max. Recommended Use Temperature	°C	250		
Curie Temperature, T _c	°C	725		
Other Properties	Flexural Strength	psi	17,400	
		MPa	120	
	Compressive Strength	psi	145,000	
		MPa	1000	
	Young's Modulus	GPa	140	
	Density	g/cm ³	8.4	
	Hardness, Vickers	Hv	600	
Electrical Resistivity, ρ	μΩ · cm	55		

Notes: (1) Coefficients measured between 20 and 150 °C
 (2) Between 20 and 200 °C
 (3) Between 20 and 150 °C



Notes The material data and demagnetization curves shown above represent typical properties that may vary due to product shape and size. Demagnetization curves show nominal Br and H_{Cj}. Magnets can be supplied thermally stabilized or magnetically calibrated to customer specifications. Additional grades are available. Please contact the factory for information.

Dimensions and shape of the magnet, in combination with required manufacturing processes, may cause the magnetic and physical characteristics to vary from typical values. Therefore, all data presented in this document are for general reference only and should not be relied upon to represent standard characteristics, nor are they guaranteed upon use. Arnold Magnetic Technologies reserves the right to change information in this document, including magnet performance standards, specifications, and characteristics without notice.