SUMITOMO METAL MINING CO., LTD
Advanced materials Div.
Applied powder materials business Unit.
Website https://crossmining.smm-g.com/

Hereby are evaluation results for mold product obtained by our company.
Result stated may differ depends on shape, mold design and molding conditions of the mold product.

① Compound properties

(magnetic properties)

Type				S3A14M	S3A12M	S3A10M	S3A14MB	S3A12MB
Directional property/Molding process				Anisotropy Injection molding				
Component	Magnet powder			Sm2Fe17N3				
	Binder Resin			PA12				
	Specific gravity		-	4.7-4.9	4.4-4.6	4.1-4.3	4.6-4.9	4.4-4.8
Magnetic properties	Residual induction	Br	T	0.76-0.80	0.69-0.74	0.64-0.69	0.75-0.80	0.69-0.75
			kG	7.6-8.0	6.9-7.4	6.4-6.9	7.5-8.0	6.9-7.5
	Coercive force	HcB	kA/m	470-540	450-530	435-500	520-590	490-560
			kOe	6.0-6.7	5.8-6.5	5.5-6.2	6.6-7.4	6.2-7.0
	Intrinsic coercive force	HcJ	kA/m	660-800	630-860	700-860	750-900	870-1000
			kOe	8.4-9.9	8.0-10.7	8.9-10.7	9.5-11.3	11.0-12.5
	Maximum energy product	(BH)max	kJ/m³	107-115	91-100	76-84	107-115	91-100
			MGOe	13.5-14.4	11.5-12.4	9.5-10.4	13.5-14.4	11.5-12.4
	Recoil permeability	μrec	-	1.1	1.1	1.1	1.1	1.1
	Reversible temperature coefficient	α(Br)	%/K	-0.07	-0.07	-0.07	-0.07	-0.07
		α(HcJ)	%/K	-0.5	-0.5	-0.5	-0.5	-0.5

- Sample-Size：φ20mm×L13mm、BH curve tracer

Representative value for mechanical properties

Type			S3A14M	S3A12M	S3A10M	S3A14MB	S3A12MB
Mechanical properties	Tensile strength	MPa	35	36	37	31	28
	Tensile elongation at break	%	0.5	0.6	0.8	0.4	0.4
	Tensile modulus of elasticity	GPa	15.2	12.1	9.1	14.3	12.3
	Flexural strength	MPa	51	71	73	59	56
	Flexural modulus of elasticity	GPa	10.4	9.1	7.3	10.3	9.4
	Poisson's ratio	-	0.3	0.3	0.3	0.3	0.3

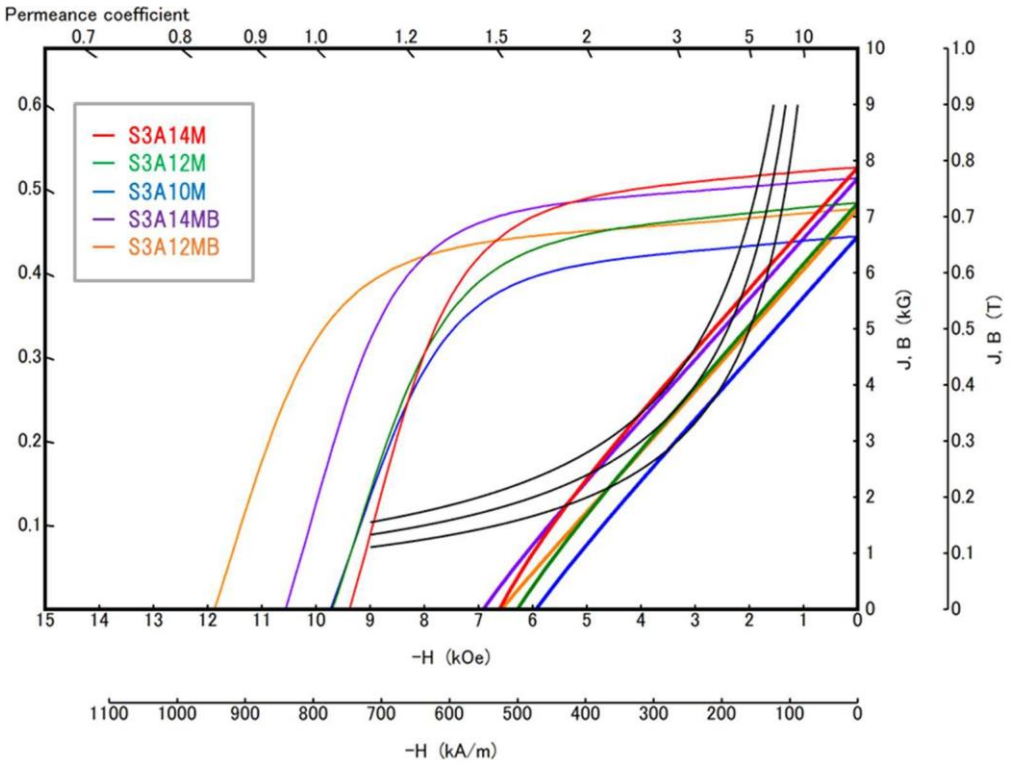
- Tensile test：ASTM D638 compliance (Test temperature 23℃)
- Flexural test：ASTM D790 compliance (Test temperature 23℃)

Representative value for thermal properties

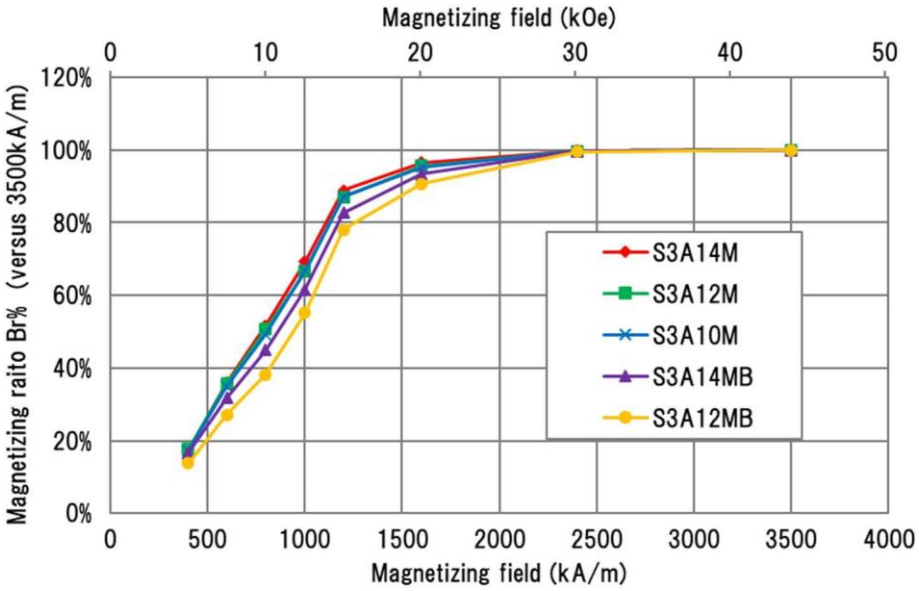
Type				S3A14M	S3A12M	S3A10M	S3A14MB	S3A12MB
Thermal properties	Flow ability	Q-value	cm^3/s	0.6	1.1	1.6	1.2	1.0
	Temp. of deflection on load	Td	℃	129	119	112	117	112
	Linear thermal expansion coefficient		10^{-5}/℃	5.8	6.3	7.8	5.8	6.1
	Molding shrinkage		%	0.51	0.84	1.0	0.76	0.79
	Flammability rating			UL-94HB	UL-94HB	UL-94HB	UL-94HB	UL-94HB

- Flow ability：JIS K 7210-1 Annex JA compliance
  Measuring temperature：250℃ Test load：588N Orifice diameter：1mm Orifice length：1mm
- Temperature for load deflection：ASTM D648 compliance Test stress：1.82MPa
- Linear thermal expansion coefficient：JIS K7197compliance Measurement direction：MD

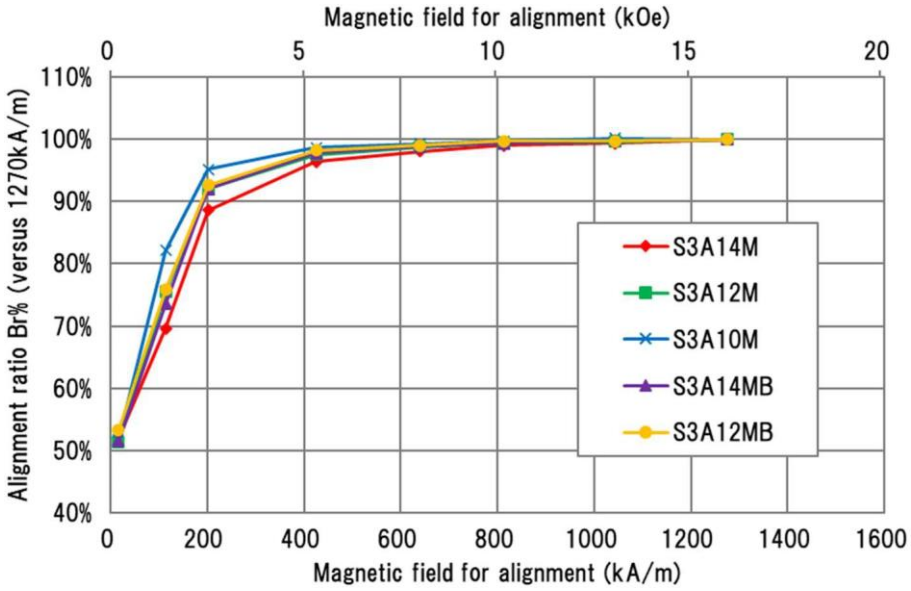
② Demagnetizing curve (Sample Size:φ20mm×L13mm)



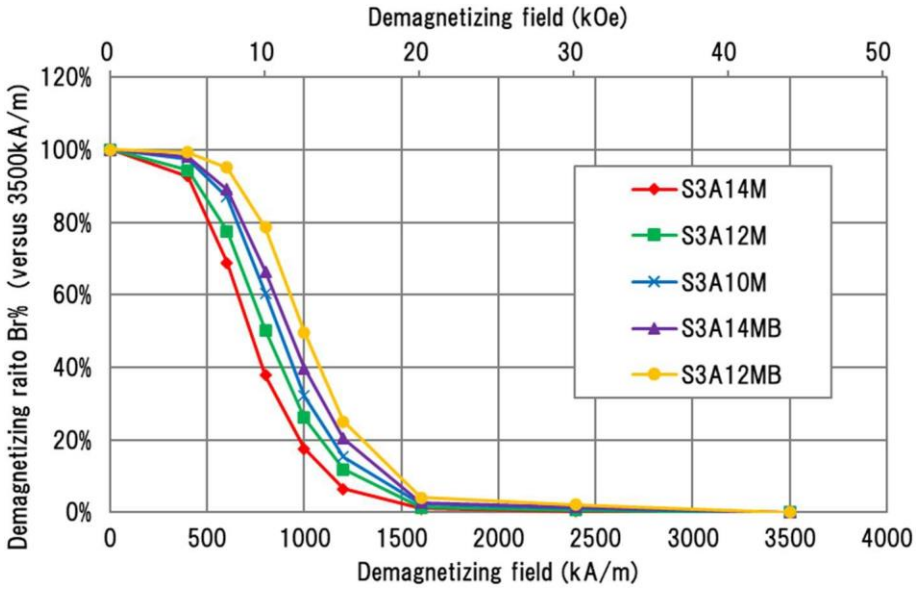
③ Magnetizing properties (Sample Size:φ20mm×L13mm)



④ Alignment properties (Sample Size: φ20mm×L13mm)

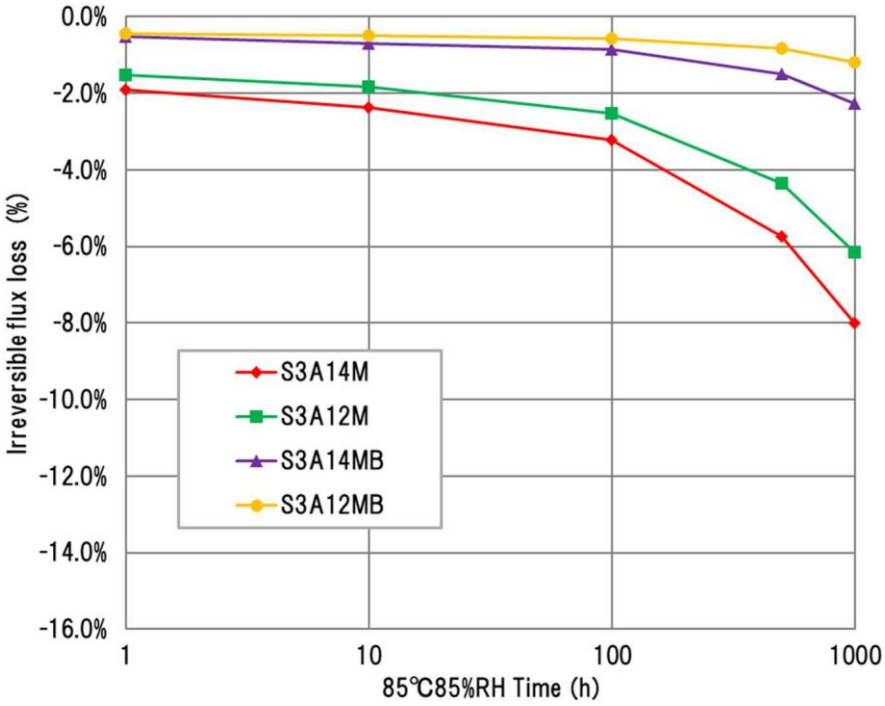


⑤ Demagnetizing properties (Sample Size: φ20mm×L13mm)

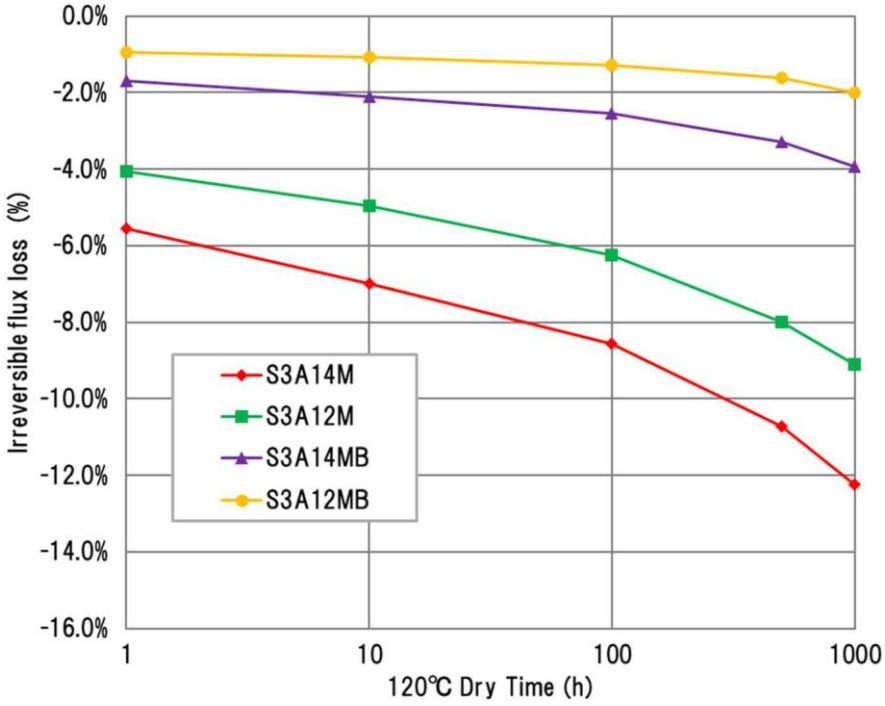


⑥ Irreversible flux loss (Sample Size: φ20mm×L13mm)

<85℃85%RH>

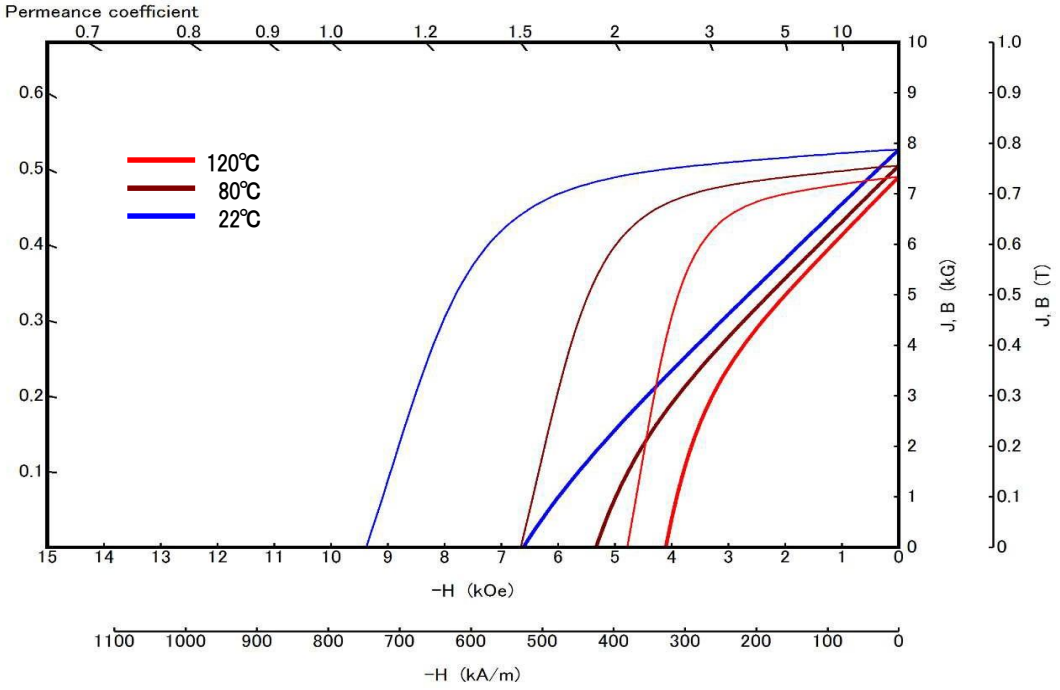


<120℃ Dry>

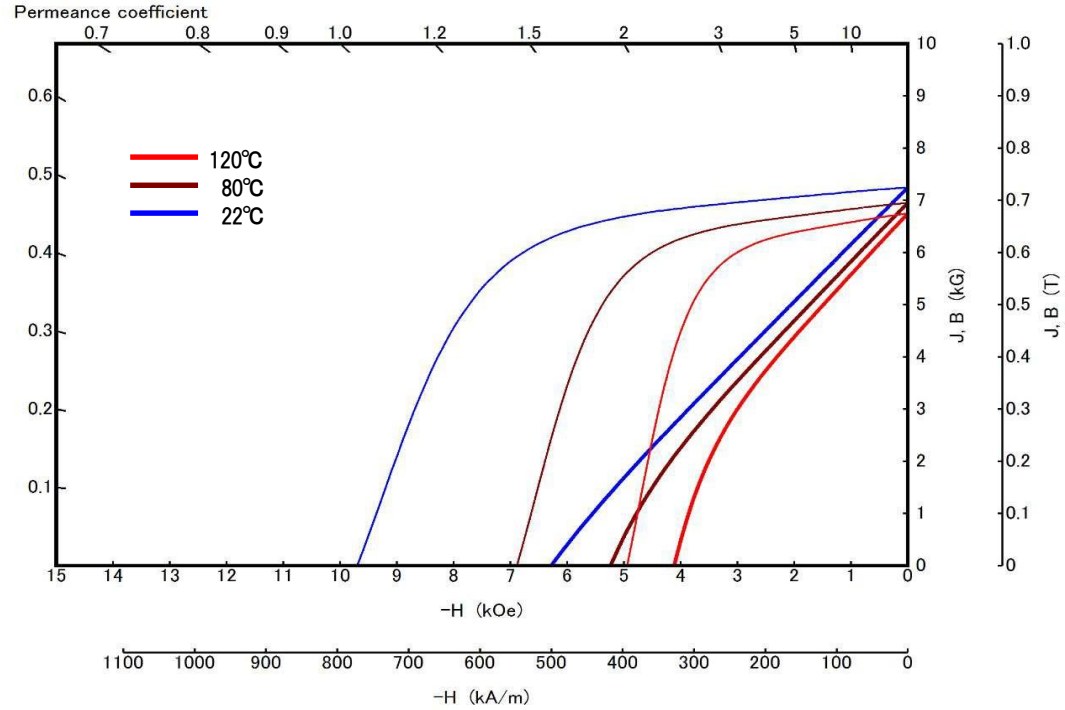


⑦ Variations of temperature for demagnetization curve (Sample Size: φ20mm×L13mm)

S3A14M

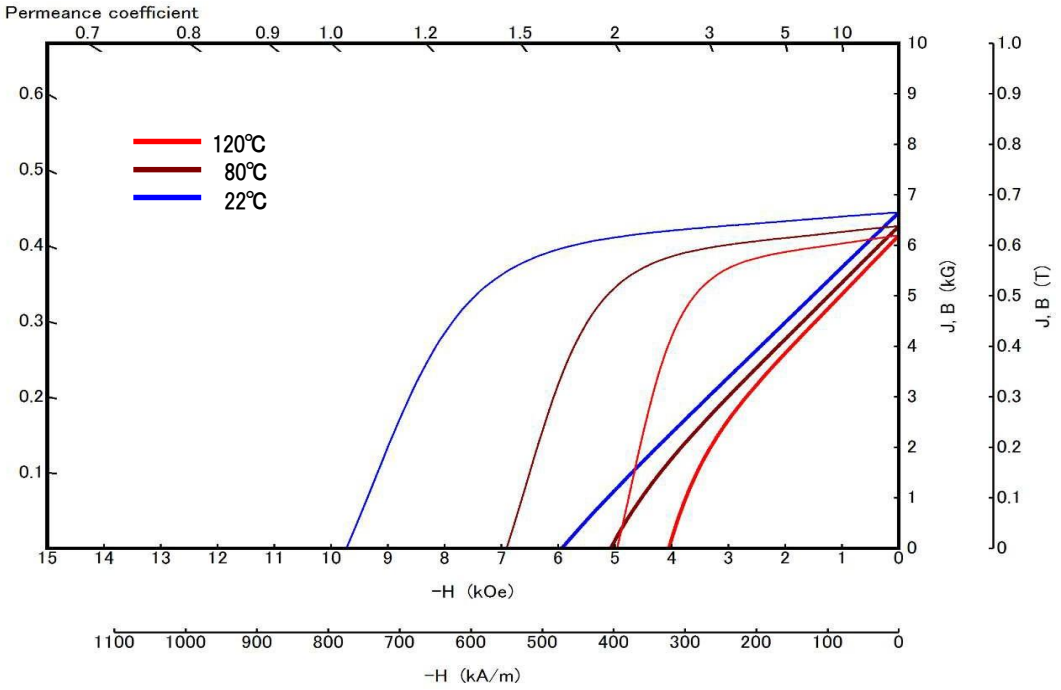


S3A12M

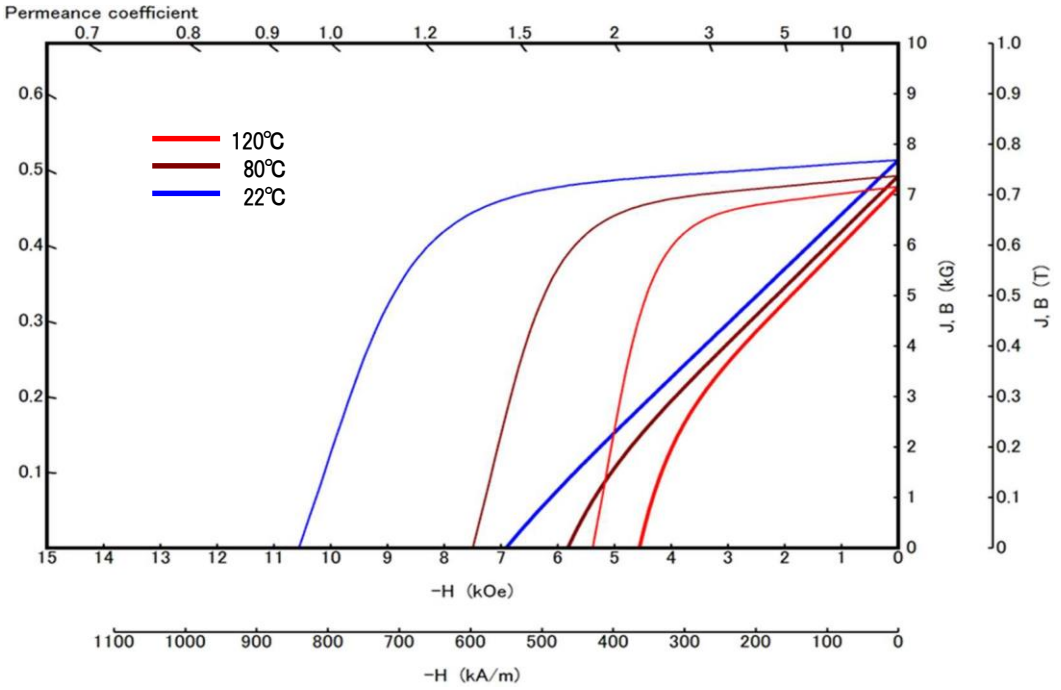


If you have any question about this product,
please feel free to contact us.
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X-MINING
SUMITOMO METAL MINING

S3A10M



S3A14MB



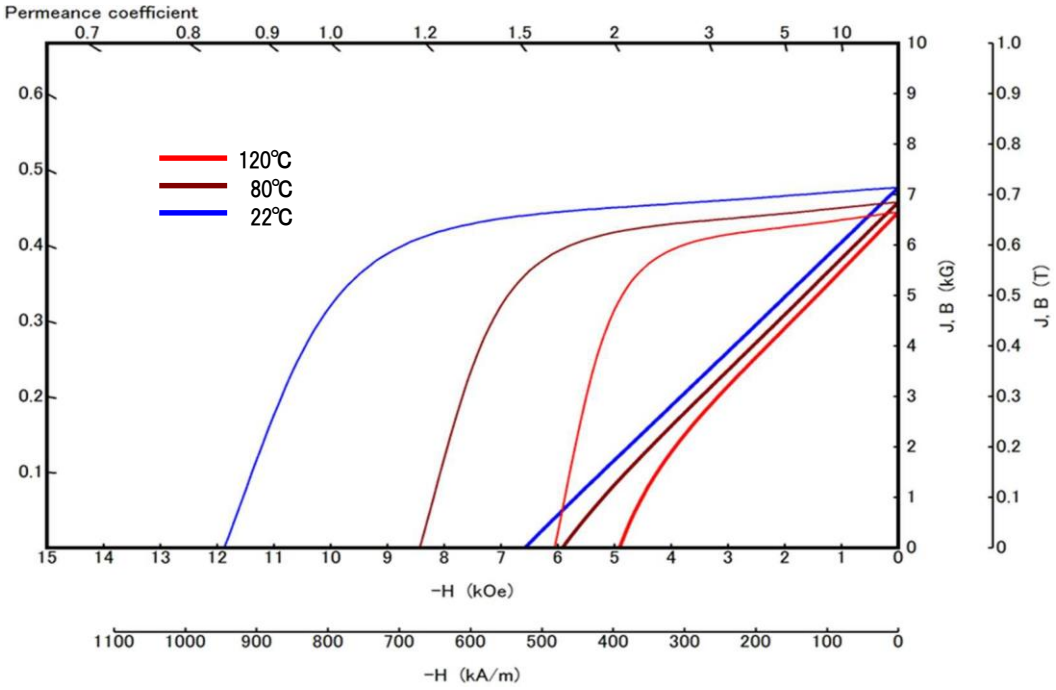
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X-MINING

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S3A12MB



⑧ Recommended molding conditions

Conditions	Wellmax™-S3A14M/ S3A12M/ S3A10M/ S3A14MB/ S3A12MB
Cylinder temperature	210～250℃
Mold temperature	80～100℃
Magnetic field for alignment	≧6 kOe ／ ≧480 kA/m
Others	Increasing the injection speed is recommend
	Increasing the cylinder temperature will tend to increase the magnetization and decrease the coercive force

【Appendix】

Company Website of Sumitomo Metal Mining Co., Ltd. (https://www.smm.co.jp/en/)

Sumitomo Metal Mining Co., Ltd.

Website of Sumitomo Metal Mining's advanced materials (X-MINING) (https://crossmining.smm-g.com/)

X-MINING | Sumitomo Metal Mining

Website of Sumitomo Metal Mining's Magnet materials (Wellmax™)

(https://crossmining.smm-g.com/material/magnet_materials/)

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