Sintered NdFeB technical reference

Selected material tables, demagnetisation curves and a reported GBD example.

Application review. Mainrich company range: **N30 to N56**, with no AH grades. The top grade depends on the series: N56, N54M, N52H, N52SH, N50UH and N45EH. The tables list selected supplier rows up to grade 45; values for the higher grades come from the same supplier tables on request. Grade, series, geometry and operating temperature are confirmed together against the drawing. This summary does not promise every combination.

How to use this document

Use the tables to compare material references. Use the supplied plots to discuss magnetic operating conditions. The agreed drawing, material specification and inspection plan define the requirements for an actual part.

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Values marked as reference data or test examples are not universal production guarantees. Obtain the agreed grade-specific specification before design release or ordering.

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F-series reference values

Selected source identifiers in the N, M and H temperature classes.

Reference data. Supplier material reference, received March 2026. Grade identifiers and ranges are reproduced as supplied. These rows do not establish availability for every shape or production route.

Grade	Br T	Hcb min. kA/m	Hcj min. kA/m	(BH)max kJ/m³	(BH)max MGOe	Temp.* °C
F45N	1.32 - 1.37	836	876	326 - 358	41 - 45	80
F42N	1.28 - 1.33	836	876	302 - 334	38 - 42	80
F40N	1.25 - 1.31	836	876	295 - 326	37 - 41	80
F38N	1.23 - 1.27	836	876	279 - 310	35 - 39	80
F35N	1.17 - 1.24	836	876	255 - 295	32 - 37	80
F45M	1.32 - 1.37	971	1114	326 - 358	41 - 45	100
F42M	1.28 - 1.33	955	1114	302 - 334	38 - 42	100
F40M	1.25 - 1.31	947	1114	295 - 326	37 - 41	100
F38M	1.23 - 1.27	915	1114	279 - 310	35 - 39	100
F35M	1.17 - 1.24	876	1114	255 - 295	32 - 37	100
F45H	1.32 - 1.37	995	1353	326 - 358	41 - 45	120
F42H	1.28 - 1.33	963	1353	302 - 334	38 - 42	120
F40H	1.25 - 1.31	947	1353	295 - 326	37 - 41	120
F38H	1.23 - 1.27	915	1353	279 - 310	35 - 39	120
F35H	1.17 - 1.24	876	1353	255 - 295	32 - 37	120
F33H	1.12 - 1.19	844	1353	239 - 271	30 - 34	120

* Supplier temperature guide at L/D = 0.7, as stated in the source table. Temperature suitability must be confirmed for the part and magnetic circuit.

Br: remanence. Hcb: coercivity. Hcj: intrinsic coercivity. (BH)max: maximum energy product. Min. denotes the minimum listed in the source table; acceptance values are agreed for the order.

Reference S-F | Supplier property table, March 2026. Chemistry, test conditions and inspection requirements are confirmed with the selected material.

N-series reference values

Selected N, M and H temperature classes.

Reference data. Supplier material reference, received March 2026. Grade identifiers and ranges are reproduced as supplied. These rows do not establish availability for every shape or production route.

Grade	Br T	Hcb min. kA/m	Hcj min. kA/m	(BH)max kJ/m³	(BH)max MGOe	Temp.* °C
N45	1.32 - 1.37	915	955	326 - 358	41 - 45	80
N42	1.28 - 1.33	915	955	302 - 334	38 - 42	80
N40	1.25 - 1.31	915	955	295 - 326	37 - 41	80
N38	1.23 - 1.27	915	955	279 - 310	35 - 39	80
N35	1.17 - 1.24	876	955	255 - 295	32 - 37	80
N45M	1.32 - 1.37	971	1114	326 - 358	41 - 45	100
N42M	1.28 - 1.33	955	1114	302 - 334	38 - 42	100
N40M	1.25 - 1.31	947	1114	295 - 326	37 - 41	100
N38M	1.23 - 1.27	915	1114	279 - 310	35 - 39	100
N35M	1.17 - 1.24	876	1114	255 - 295	32 - 37	100
N45H	1.32 - 1.37	995	1353	326 - 358	41 - 45	120
N42H	1.28 - 1.33	963	1353	302 - 334	38 - 42	120
N40H	1.25 - 1.31	947	1353	295 - 326	37 - 41	120
N38H	1.23 - 1.27	915	1353	279 - 310	35 - 39	120
N35H	1.17 - 1.24	876	1353	255 - 295	32 - 37	120
N33H	1.12 - 1.19	844	1353	239 - 271	30 - 34	120

* Supplier temperature guide at L/D = 0.7, as stated in the source table. Temperature suitability must be confirmed for the part and magnetic circuit.

Br: remanence. Hcb: coercivity. Hcj: intrinsic coercivity. (BH)max: maximum energy product. Min. denotes the minimum listed in the source table; acceptance values are agreed for the order.

Reference S-N | Supplier property table, March 2026. Chemistry, test conditions and inspection requirements are confirmed with the selected material.

N-series reference values

Selected SH, UH and EH temperature classes.

Reference data. Supplier material reference, received March 2026. Grade identifiers and ranges are reproduced as supplied. These rows do not establish availability for every shape or production route.

Grade	Br T	Hcb min. kA/m	Hcj min. kA/m	(BH)max kJ/m³	(BH)max MGOe	Temp.* °C
N45SH	1.32 - 1.37	995	1592	326 - 358	41 - 45	150
N42SH	1.28 - 1.33	963	1592	302 - 334	38 - 42	150
N40SH	1.25 - 1.31	947	1592	295 - 326	37 - 41	150
N38SH	1.23 - 1.27	915	1592	279 - 310	35 - 39	150
N35SH	1.17 - 1.24	876	1592	255 - 287	32 - 36	150
N33SH	1.12 - 1.19	844	1592	239 - 271	30 - 34	150
N45UH	1.32 - 1.37	995	1990	326 - 358	41 - 45	180
N42UH	1.28 - 1.33	963	1990	302 - 334	38 - 42	180
N40UH	1.25 - 1.31	939	1990	295 - 326	37 - 41	180
N38UH	1.23 - 1.27	915	1990	279 - 310	35 - 39	180
N35UH	1.17 - 1.24	876	1990	255 - 287	32 - 36	180
N33UH	1.12 - 1.19	844	1990	239 - 271	30 - 34	180
N30UH	1.08 - 1.13	812	1990	215 - 247	27 - 31	180
N40EH	1.25 - 1.31	939	2388	295 - 326	37 - 41	200
N38EH	1.23 - 1.27	915	2388	279 - 310	35 - 39	200
N35EH	1.17 - 1.24	876	2388	255 - 287	32 - 36	200
N33EH	1.12 - 1.19	844	2388	239 - 271	30 - 34	200
N30EH	1.08 - 1.13	812	2388	215 - 247	27 - 31	200

* Supplier temperature guide at L/D = 0.7, as stated in the source table. Temperature suitability must be confirmed for the part and magnetic circuit.

Br: remanence. Hcb: coercivity. Hcj: intrinsic coercivity. (BH)max: maximum energy product. Min. denotes the minimum listed in the source table; acceptance values are agreed for the order.

Reference S-N | Supplier property table, March 2026. Chemistry, test conditions and inspection requirements are confirmed with the selected material.

D-series reference values

Selected grain-boundary-diffusion material identifiers.

Reference data. Supplier material reference, received March 2026. Grade identifiers and ranges are reproduced as supplied. These rows do not establish availability for every shape or production route.

Grade	Br T	Hcb min. kA/m	Hcj min. kA/m	(BH)max kJ/m³	(BH)max MGOe	Temp.* °C
D45SH	1.32 - 1.37	995	1592	326 - 358	41 - 45	150
D42SH	1.28 - 1.33	963	1592	302 - 334	38 - 42	150
D45UH	1.32 - 1.37	995	1990	326 - 358	41 - 45	180
D42UH	1.28 - 1.33	963	1990	302 - 334	38 - 42	180
D40UH	1.25 - 1.31	931	1990	295 - 326	37 - 41	180
D38UH	1.23 - 1.27	915	1990	279 - 310	35 - 39	180
D35UH	1.17 - 1.24	876	1990	255 - 287	32 - 36	180
D45EH	1.32 - 1.37	995	2388	326 - 358	41 - 45	200
D42EH	1.28 - 1.33	963	2388	302 - 334	38 - 42	200
D40EH	1.25 - 1.31	931	2388	295 - 326	37 - 41	200
D38EH	1.23 - 1.27	899	2388	279 - 310	35 - 39	200
D35EH	1.17 - 1.24	876	2388	255 - 287	32 - 36	200
D33EH	1.12 - 1.19	844	2388	239 - 271	30 - 34	200
D30EH	1.08 - 1.13	796	2388	215 - 247	27 - 31	200

* Supplier temperature guide at L/D = 0.7, as stated in the source table. Temperature suitability must be confirmed for the part and magnetic circuit.

Br: remanence. Hcb: coercivity. Hcj: intrinsic coercivity. (BH)max: maximum energy product. Min. denotes the minimum listed in the source table; acceptance values are agreed for the order.

Reference S-D | Supplier property table, March 2026. Chemistry, test conditions and inspection requirements are confirmed with the selected material.

Dimensions and surface treatment

Specify the finished part and the features that matter to its application.

Finished dimensions

Provide a dimensioned drawing with the magnetisation direction, coating allowance and critical features identified. Confirm each tolerance for the selected grade, geometry and manufacturing route.

Radial-oriented ring reference

Feature	Documented reference window
Outer diameter	20 - 75 mm
Inner diameter	15 - 68 mm
Wall thickness	2 - 7 mm
Height	5 - 50 mm
Standard dimensional tolerance	±0.05 mm within this documented window

Radial ring scope. This envelope is qualification guidance. Its endpoints are not freely interchangeable. Final dimensions, tighter features, pole count and skew require drawing review. Radial-ring grade and temperature classes can be narrower than the company range. Confirm the proposed ring. This window does not apply to integrated Halbach rings.

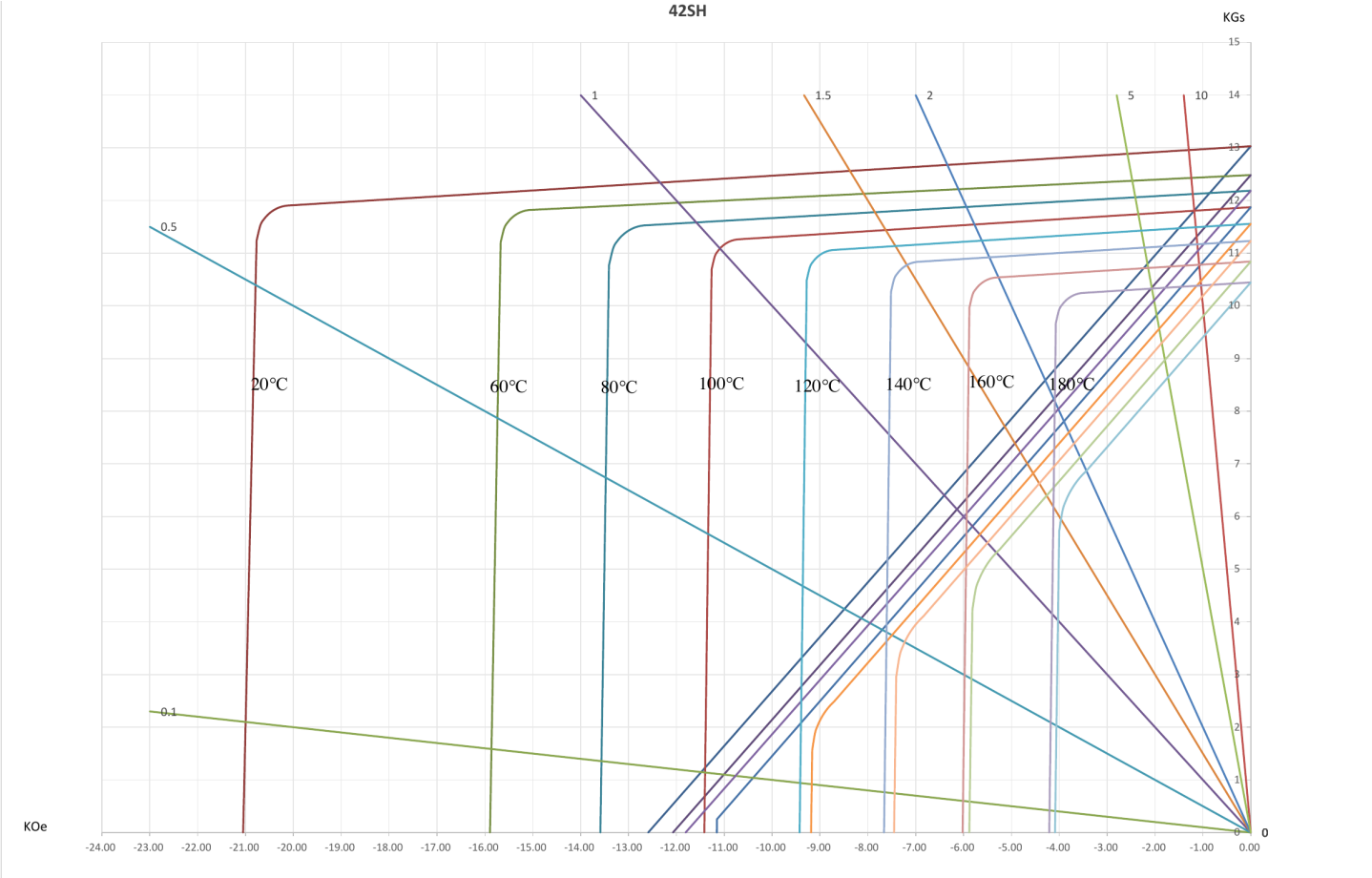
Surface treatment

Coating options for review include Ni, Ni-Cu-Ni, Zn, epoxy, phosphating and passivation. Specify the coating stack, thickness, dimensional allowance and environmental requirement together. Corrosion-test duration and pass criteria are agreed for the part.

Reference S-RAD | Radial multipole ring technical record, Rev A, 31 July 2026, pages 2 and 5. Coating options: April 2026 specification, page 14. Coating details are confirmed in the part specification.

42SH demagnetisation curves

Original supplier plot. The grade identifier, curves and axes are retained as supplied.

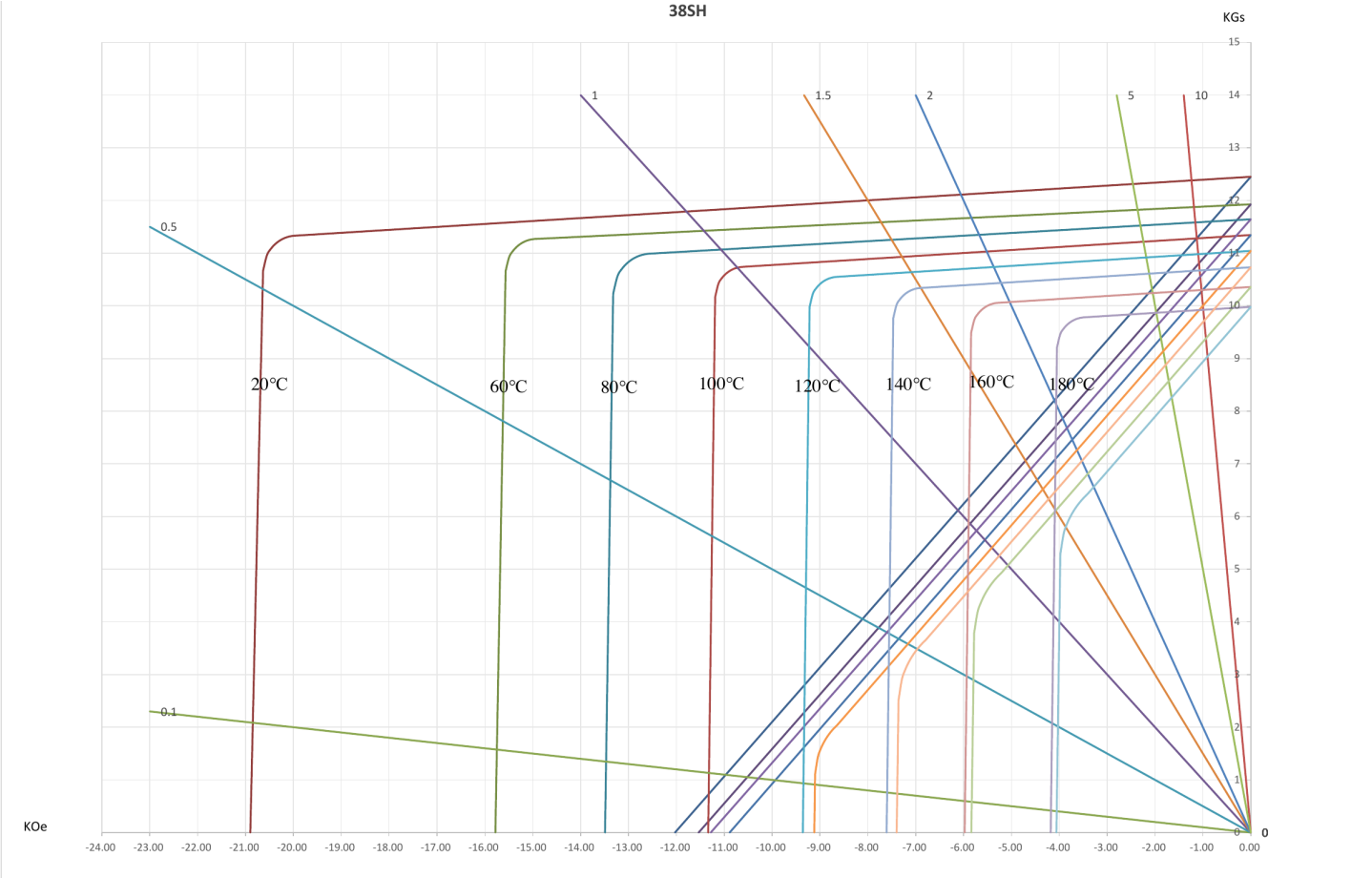


Reference plot. Obtain the curve applicable to the agreed material route and geometry. A plotted test temperature is not an allowable operating-temperature guarantee.

Reference C-42SH | Original curve file supplied March 2026

38SH demagnetisation curves

Original supplier plot. The grade identifier, curves and axes are retained as supplied.

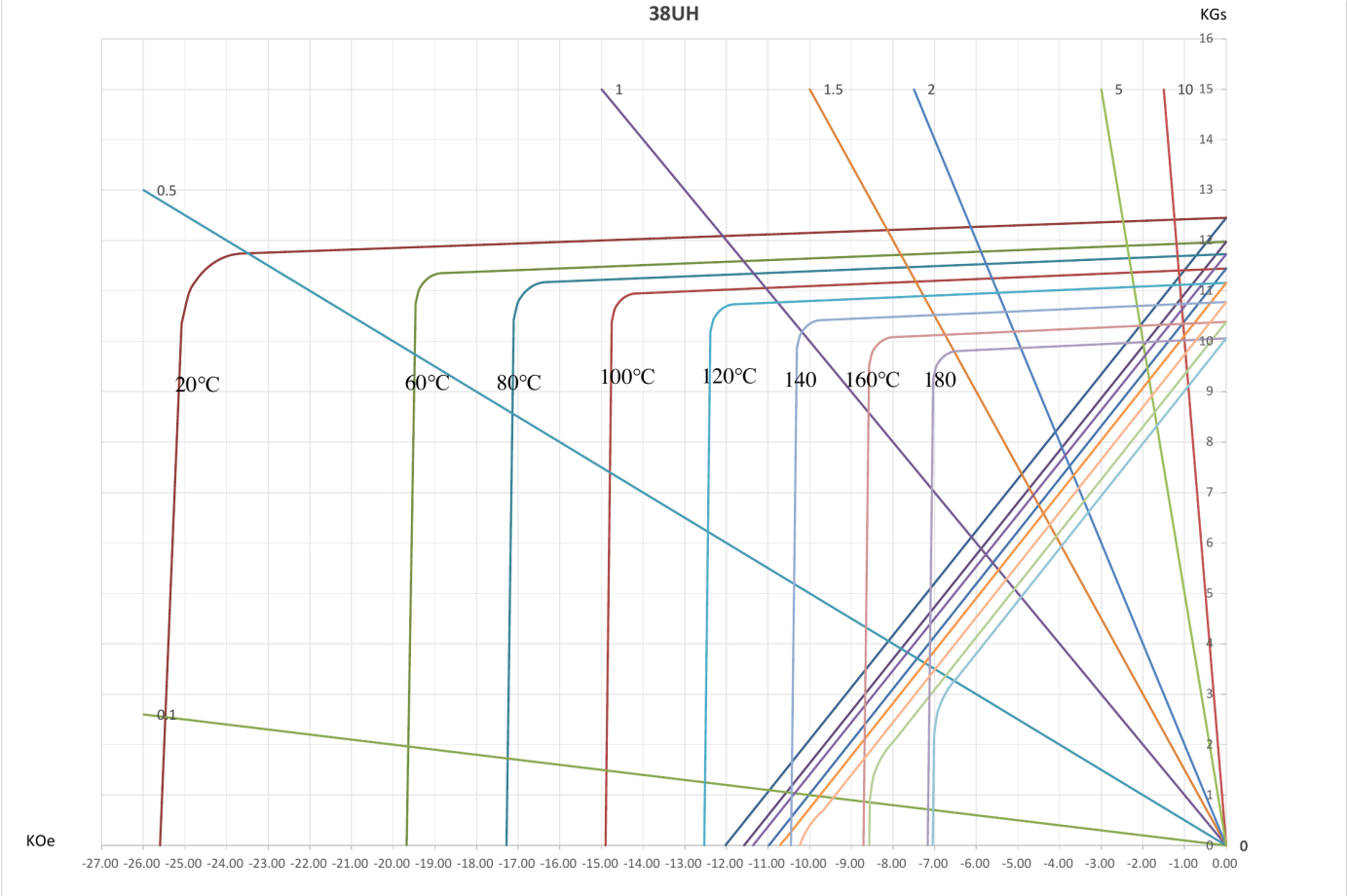


Reference plot. Obtain the curve applicable to the agreed material route and geometry. A plotted test temperature is not an allowable operating-temperature guarantee.

Reference C-38SH | Original curve file supplied March 2026

38UH demagnetisation curves

Original supplier plot. The grade identifier, curves and axes are retained as supplied.

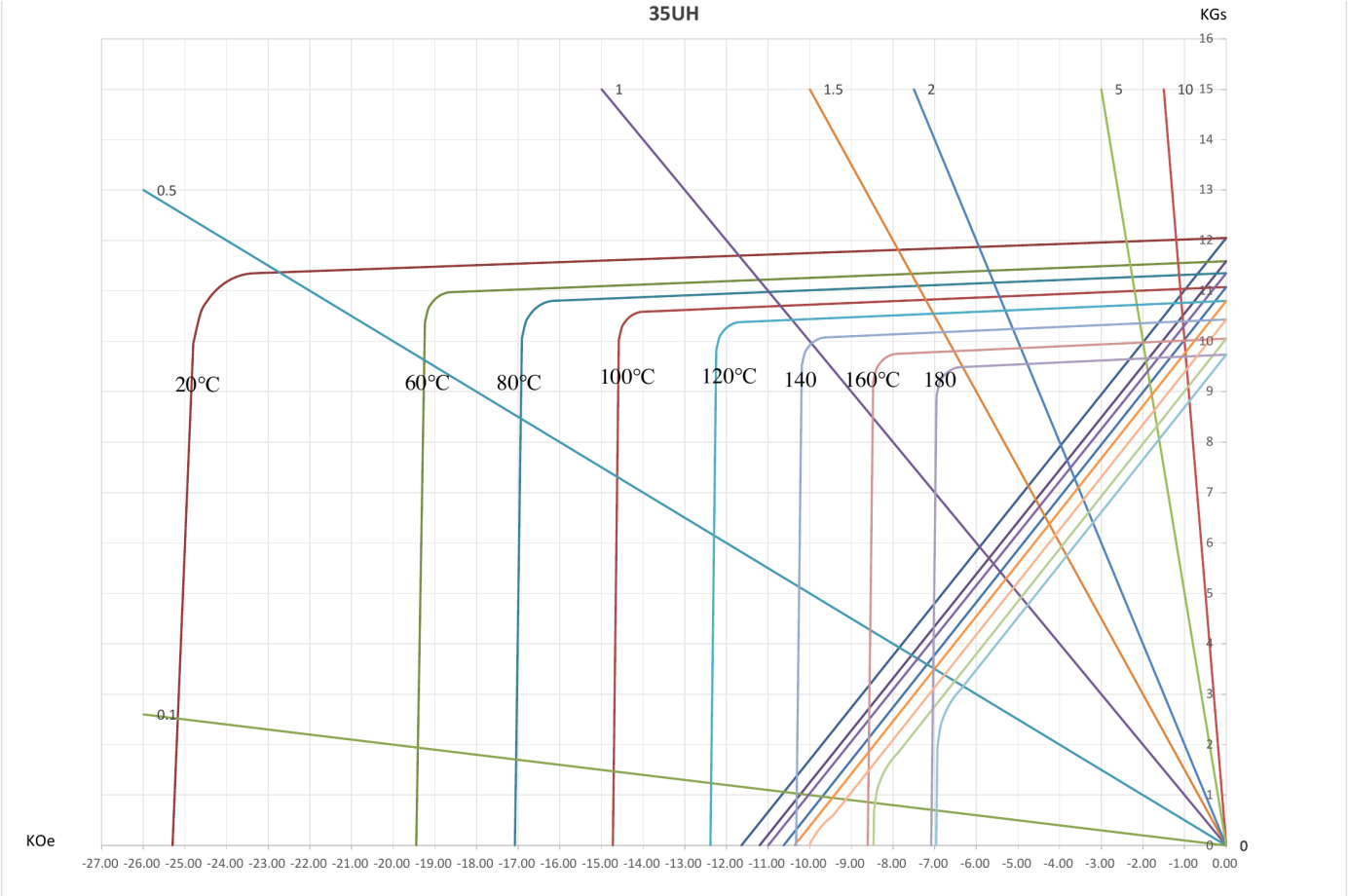


Reference plot. Obtain the curve applicable to the agreed material route and geometry. A plotted test temperature is not an allowable operating-temperature guarantee.

Reference C-38UH | Original curve file supplied March 2026

35UH demagnetisation curves

Original supplier plot. The grade identifier, curves and axes are retained as supplied.

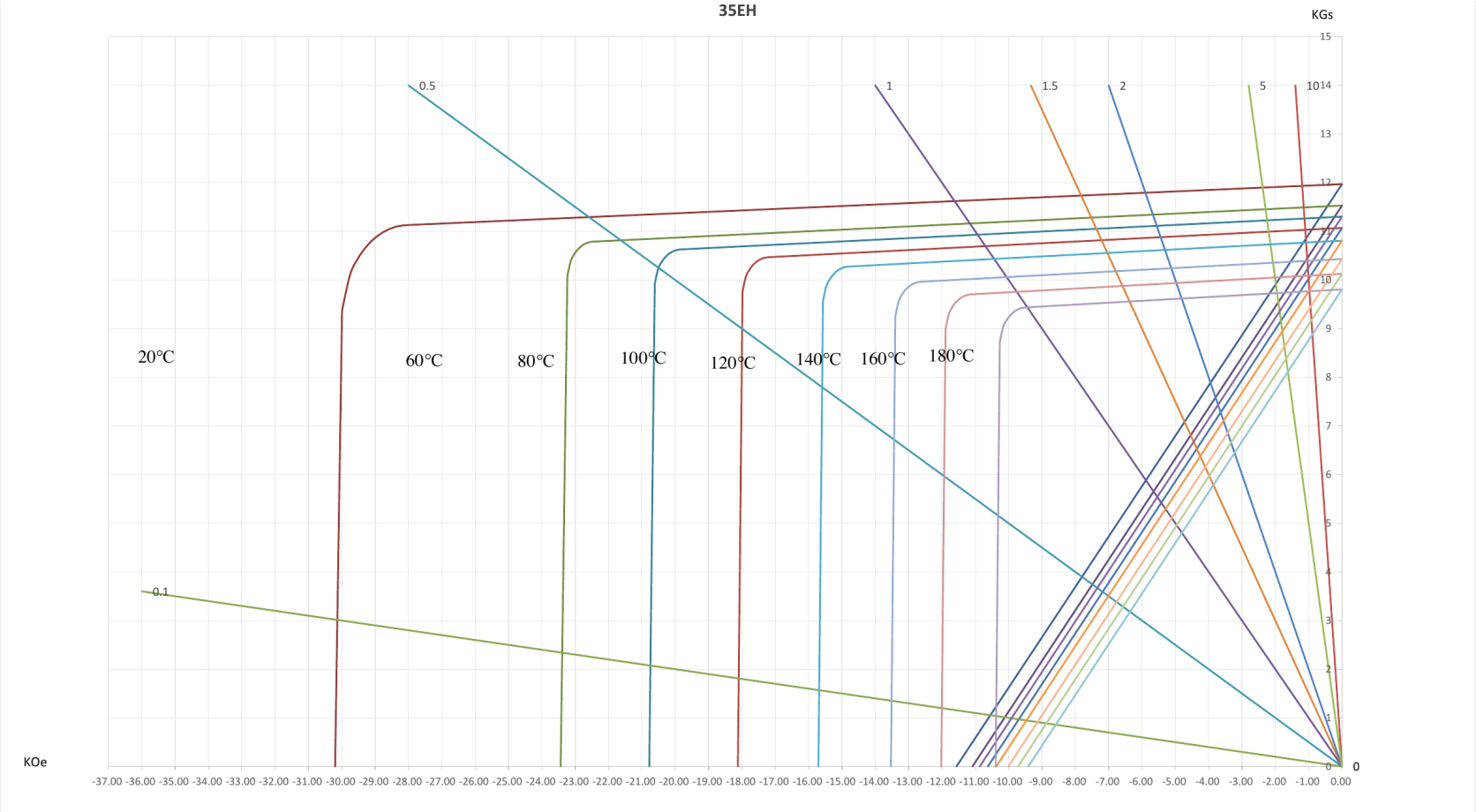


Reference plot. Obtain the curve applicable to the agreed material route and geometry. A plotted test temperature is not an allowable operating-temperature guarantee.

Reference C-35UH | Original curve file supplied March 2026

35EH demagnetisation curves

Original supplier plot. The grade identifier, curves and axes are retained as supplied.



Reference plot. Obtain the curve applicable to the agreed material route and geometry. A plotted test temperature is not an allowable operating-temperature guarantee.

Reference C-35EH | Original curve file supplied March 2026

GBD magnetic-performance example

Reported comparison of an N45H specimen before and after grain boundary diffusion.

Test scope. The supplied experiment identifies a **0.35% Tb coating** and an H-to-UH grade change. These are the results of that example, not a guarantee for every geometry or grade.

Measurement	Before GBD	After GBD	Change
Reported grade	45H	45UH	H to UH
Br / kGs	13.62	13.61	-0.01
Hcj / kOe	17.67	26.55	+8.88
(BH)max / MGOe	45.42	45.40	-0.02

Unit conversion: 1 kGs = 0.1 T; 1 kOe ≈ 79.577 kA/m; 1 MGOe ≈ 7.958 kJ/m³. Source values retain their original units and rounding.

What the measurements show

Hcj increased by approximately **50%**. The recorded changes in Br and (BH)max were -0.01 kGs and -0.02 MGOe respectively.

Applying the result

Review the required material, diffusion route and part geometry together. This comparison does not establish a general reduction in total heavy rare earth content or a motor-performance gain.

Evidence boundary. Specimen dimensions, test date, sample count and measurement uncertainty were not supplied with this comparison. Confirm the required test evidence for the intended part.

Reference S-GBD | Supplier GBD comparison workbook, received March 2026, N45H experiment, cells A3:E6. Unit conversions: NIST, Units for Magnetic Properties.

Information for an enquiry

A drawing and operating conditions allow the material and inspection requirements to be reviewed together.

Include	Details
Drawing and quantity	Part dimensions, critical features, drawing revision, sample quantity and expected production demand.
Magnetic requirement	Required grade or magnetic properties; magnetisation direction, pole pattern and relevant magnetic-circuit details.
Operating environment	Temperature conditions and exposure to moisture, chemicals or other relevant environments.
Surface treatment	Coating stack, thickness allowance, appearance and corrosion-test acceptance criteria.
Quality documentation	Material and dimensional reports, inspection plan and any required PPAP submission level.
Delivery requirements	Required destination and date, plus any packaging or shipment constraints.

Before an order is placed

Confirm the grade and material route, finished dimensions, coating, magnetic acceptance values and inspection requirements in the agreed specification. Production timing and delivery arrangements are confirmed with the quotation.

Documentation

PPAP scope and any process-capability studies are agreed for the part. Certification evidence should identify the relevant production site, legal entity and validity period.

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