

Stratton Products Ltd - Comparison Between N48SH (Current) & N45SH (Replacement)

Full Parameter Name	Abbreviation	Short Description	N48SH (Current)	N45SH (Replacement)	N48SH vs N45SH	Comments
Residual Induction (Remanence)	Br	Magnetic flux density remaining with no external field.	1,390 mT (13,900 G)	1,350 mT (13,500 G)	Same	N48SH is slightly stronger
Coercivity (Normal)	HcB	Field required to reduce magnetization to zero.	1,011 kA/m (12,700 Oe)	979 kA/m (12,300 Oe)	Worse	
Intrinsic Coercivity	HcJ	Resistance to irreversible demagnetization.	995 kA/m (12,500 Oe)	979 kA/m (12,300 Oe)	Better	N48SH offers modestly better resistance
Maximum Energy Product	(BH)max	Energy density; overall magnet strength.	374 kJ/m³ (~47 MGOe)	354 kJ/m³ (~44 MGOe)	Better	N48SH presents a slight edge
Reversible Temp. Coefficient of Br	α(Br)	Percent change in Br per °C.	−0.12 %/°C	−0.12 %/°C	Same	
Reversible Temp. Coefficient of HcJ	α(HcJ)	Percent change in HcJ per °C.	−0.535 %/°C	−0.549 %/°C	Worse	
Maximum Operating Temperature	Tw	Maximum recommended working temperature.	150 °C	150 °C	Same	
Curie Temperature	Tc	Temperature where permanent magnetism is lost.	≈310 °C	≈310 °C	Same	
Density	ρ	Mass per unit volume.	7.6 g/cm³	7.6 g/cm³	Same	is effectively identical, as per available data
Electrical Resistivity (parallel // perpendicular)	pe // pe⊥	Resistivity along and across magnetization axis.	150 // 130 μΩ·cm	150 // 130 μΩ·cm	Same	
Coefficient of Thermal Expansion (parallel // perpendicular)	CTE C// // C⊥	Linear expansion per °C ×10 ^{−6} .	7 // −1	7 // −1	Same	
Thermal Conductivity	k	Heat conduction capability.	5.3–5.8 kcal/m·h·°C	5.3–5.8 kcal/m·h·°C	Same	
Specific Heat	c	Heat capacity per unit mass (20–140 °C).	0.11 cal/g·°C	0.11 cal/g·°C	Same	
Flexural Strength	σf	Resistance to bending failure.	41,300 psi (≈285 MPa)	41,300 psi (≈285 MPa)	Same	
Hardness (Vickers)	Hv	Indentation hardness.	≈620	≈620	Same	

Notes on the Comparison:

Strength vs. Coercivity Trade-off: N48SH (old) offers higher **remanence** and **energy product**, making it slightly more powerful than N45SH (replacement).

However, N45SH has a marginally higher **intrinsic coercivity** relative to what would be expected, though in absolute value N48SH still holds a small edge on HcJ.

This suggests a nuanced trade-off depending on the application.

Thermal Performance: Both grades have the same maximum operating temperature (≈150 °C), and linear temperature coefficients (α(Br), α(HcJ)) are nearly identical—implying similar thermal behaviour.

Which Is “Replacement”?: If N45SH is truly intended as the “replacement,” it might imply manufacturing or supply chain benefits or standardization—not necessarily improved magnetic strength per se.