

Amorphous Alloys for Transformer Cores

Metglas® Amorphous Transformer cores are manufactured from low loss Metglas® 2605SA1 and Metglas® 2605HB1M transformer core alloys. These low loss, high permeability alloys have excellent performance for single and three phase commercial, industrial and distribution transformer applications.

1. Alloys and the specification

Alloy		2605SA1	2605HB1M
Induction at 60 Hz and 80 A/m* (T)		≥1.35	≥1.50
Core Loss* (W/kg)	at 60 Hz and 1.3 T	≤0.17	≤0.17
	at 60 Hz and 1.4 T	≤0.20	≤0.20
Exciting Apparent Power* at 60 Hz and 1.4 T (VA/kg)		≤1.10	≤0.50

* These numbers in the above table are measured according to ASTM A 932/A 932 M - 01.

2. General Properties and Characteristics

Electromagnetic

Alloy	Saturation Induction (T)	Electrical Resistivity ($\mu\Omega\text{m}$)	Magnetostriction ($\times 10^{-6}$)	Curie Temperature ($^{\circ}\text{C}$)
2605SA1	1.56	1.3	27	395
2605HB1M	1.63	1.2	27	364

The numbers in the above table are not guaranteed

Physical

Alloy	Density (g/cm^3)	Crystallization Temperature ($^{\circ}\text{C}$)	Tensile Strength (N/mm^2)	Young's Modulus (GPa)	Vickers Hardness Hv-50 g load	Thermal Expansion Coefficient ($\times 10^{-6}/^{\circ}\text{C}$)
						30 - 300 $^{\circ}\text{C}$
2605SA1	7.18	510	2,000	110	900	7.6
2605HB1M	7.33	489	2,100	120	900	4.3

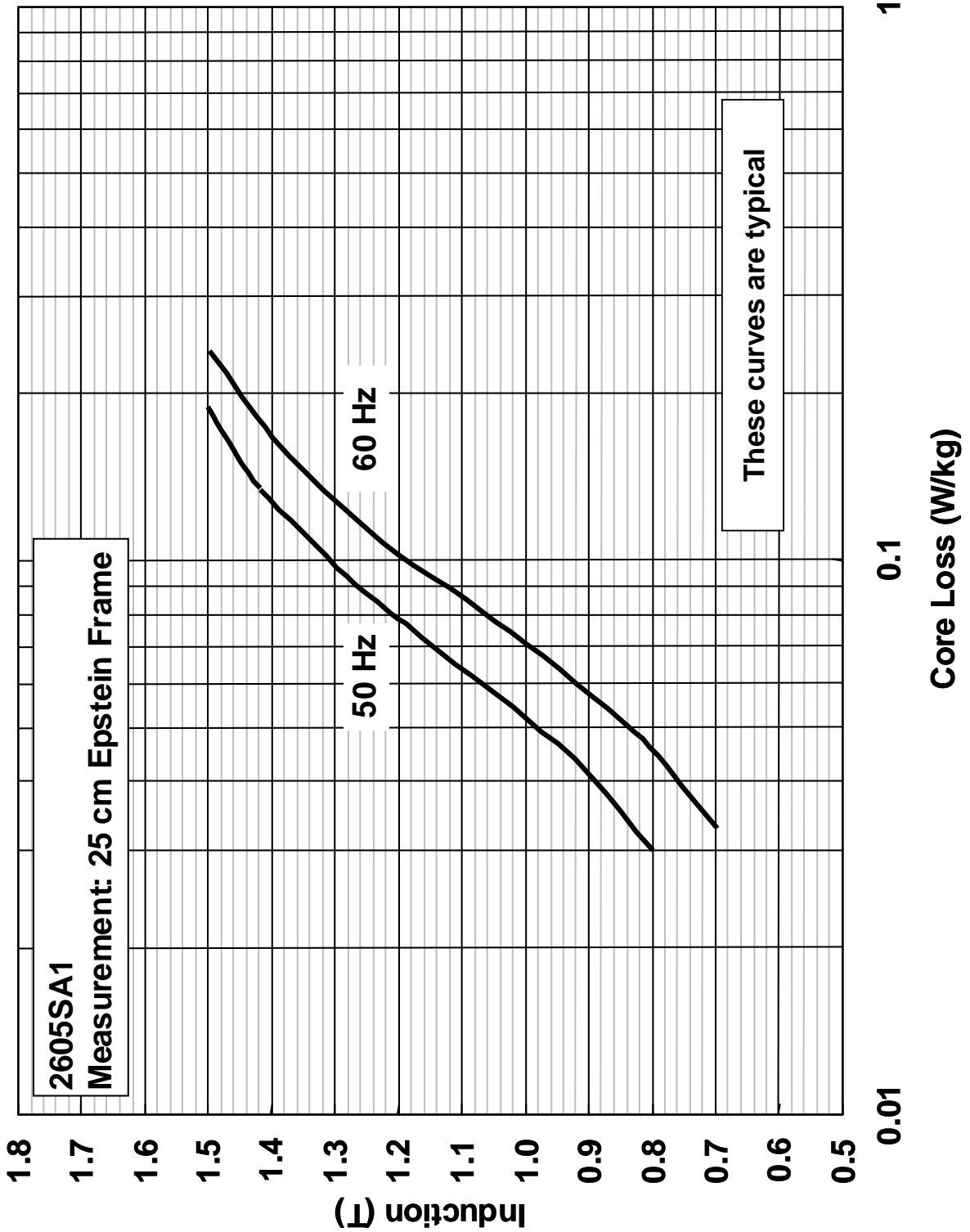
The numbers in the above table are not guaranteed

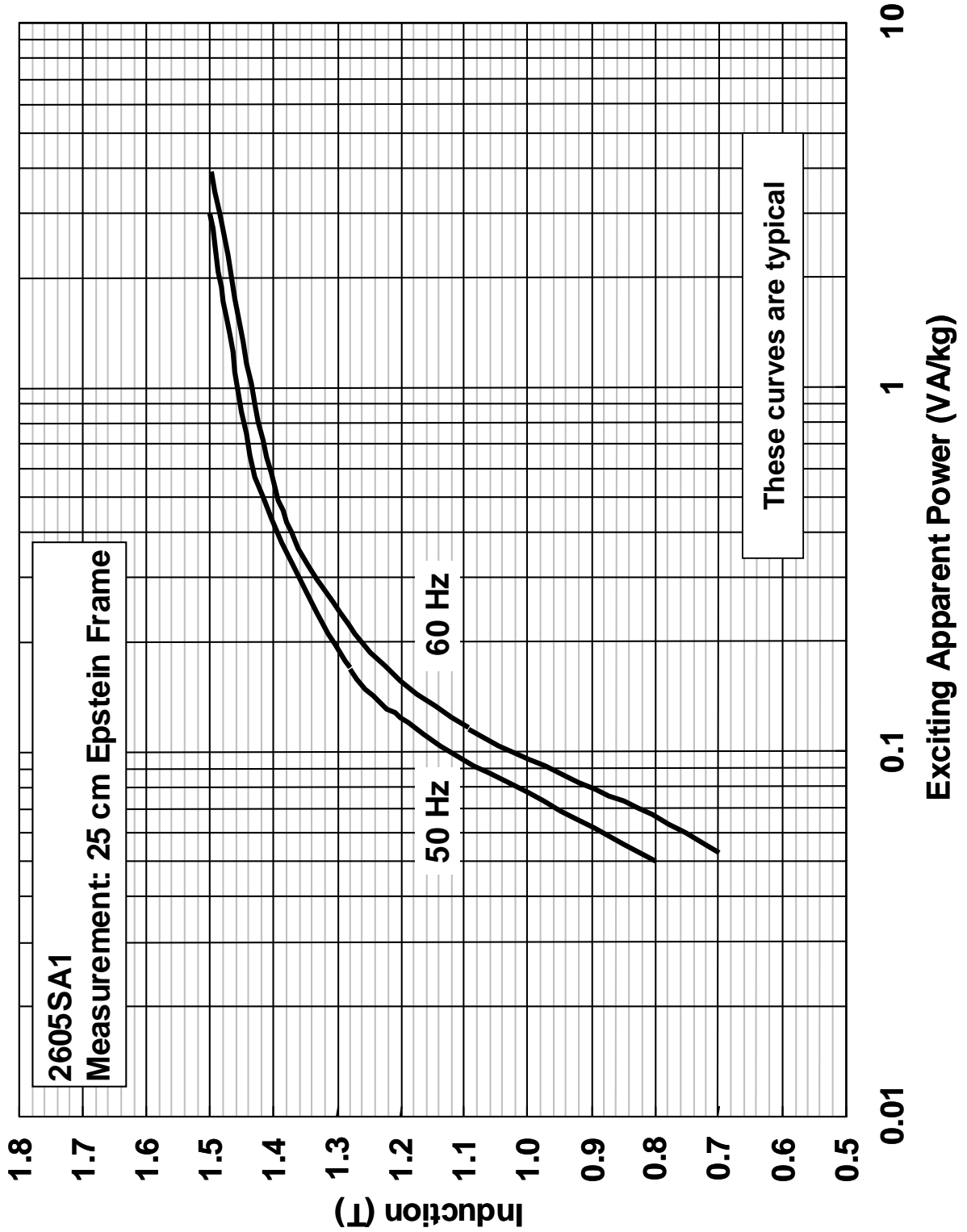
3. Ribbon Dimensions and Lamination Factor

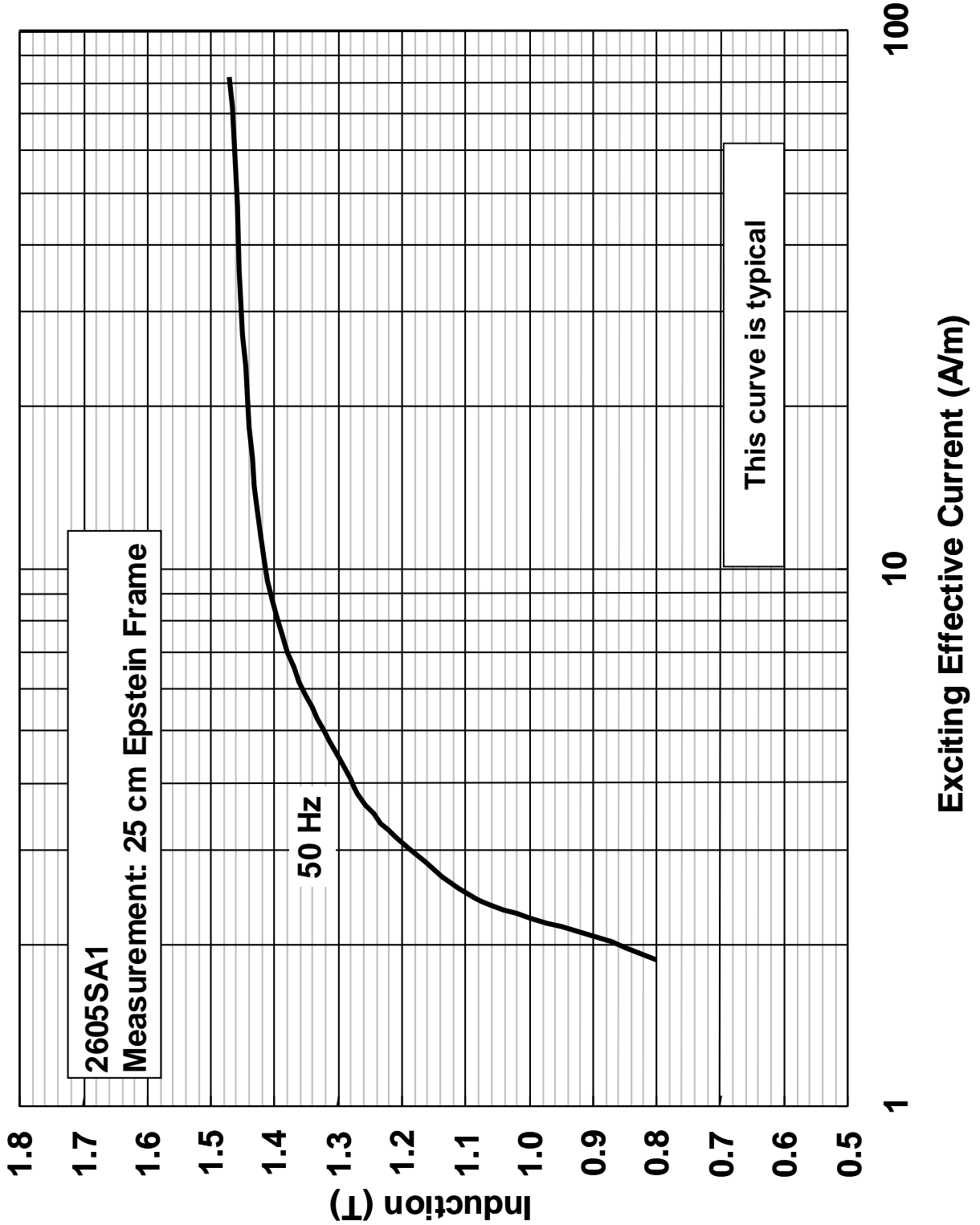
Alloy	Thickness (μm)	Standard Available Widths (mm)			Lamination Factor (%)
		142.2 ± 1.0	170.2 ± 1.1	213.4 ± 1.4	
2605SA1	25 ± 4	142.2 ± 1.0	170.2 ± 1.1	213.4 ± 1.4	≥84
2605HB1M					

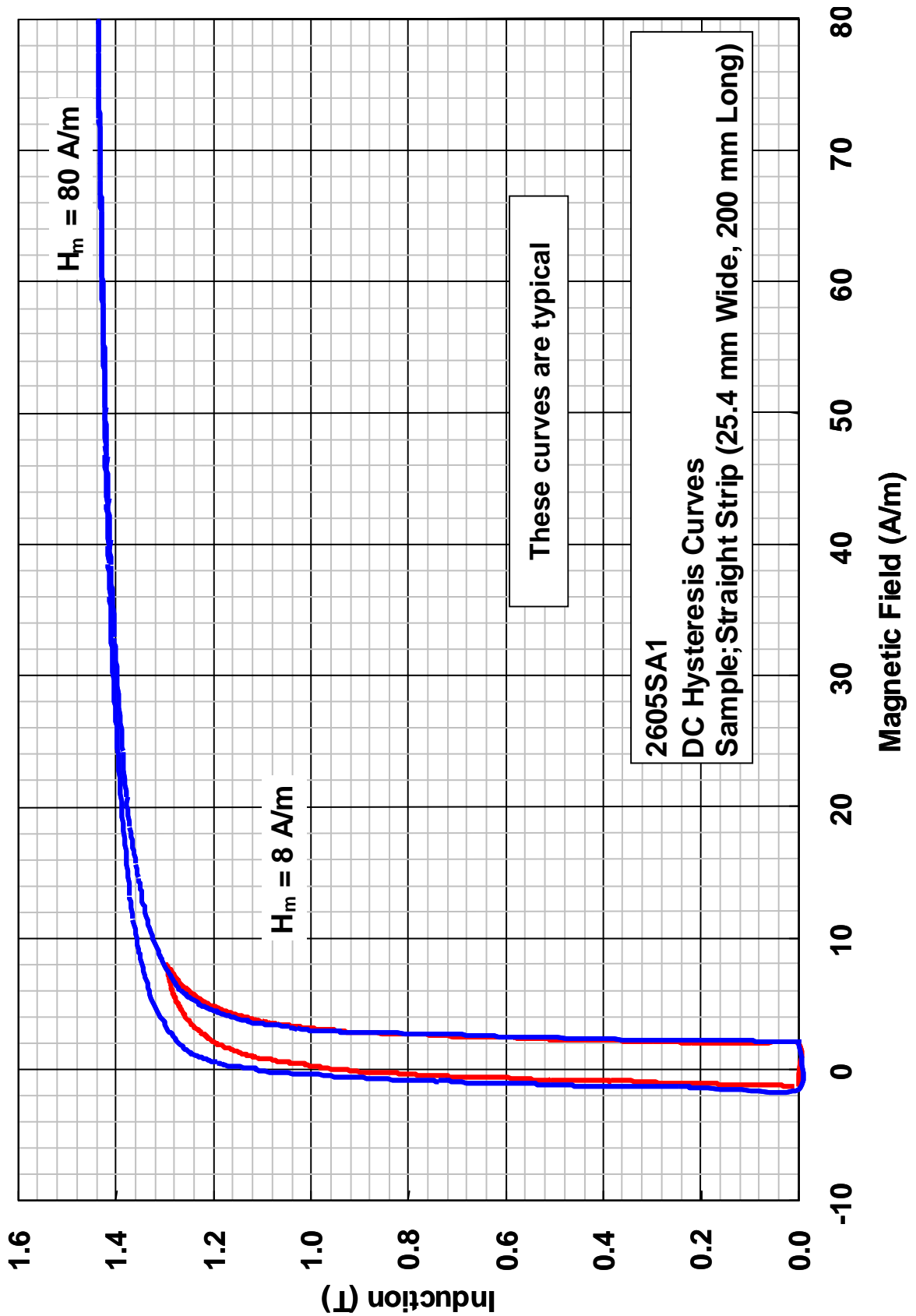
4. Typical Magnetic Properties

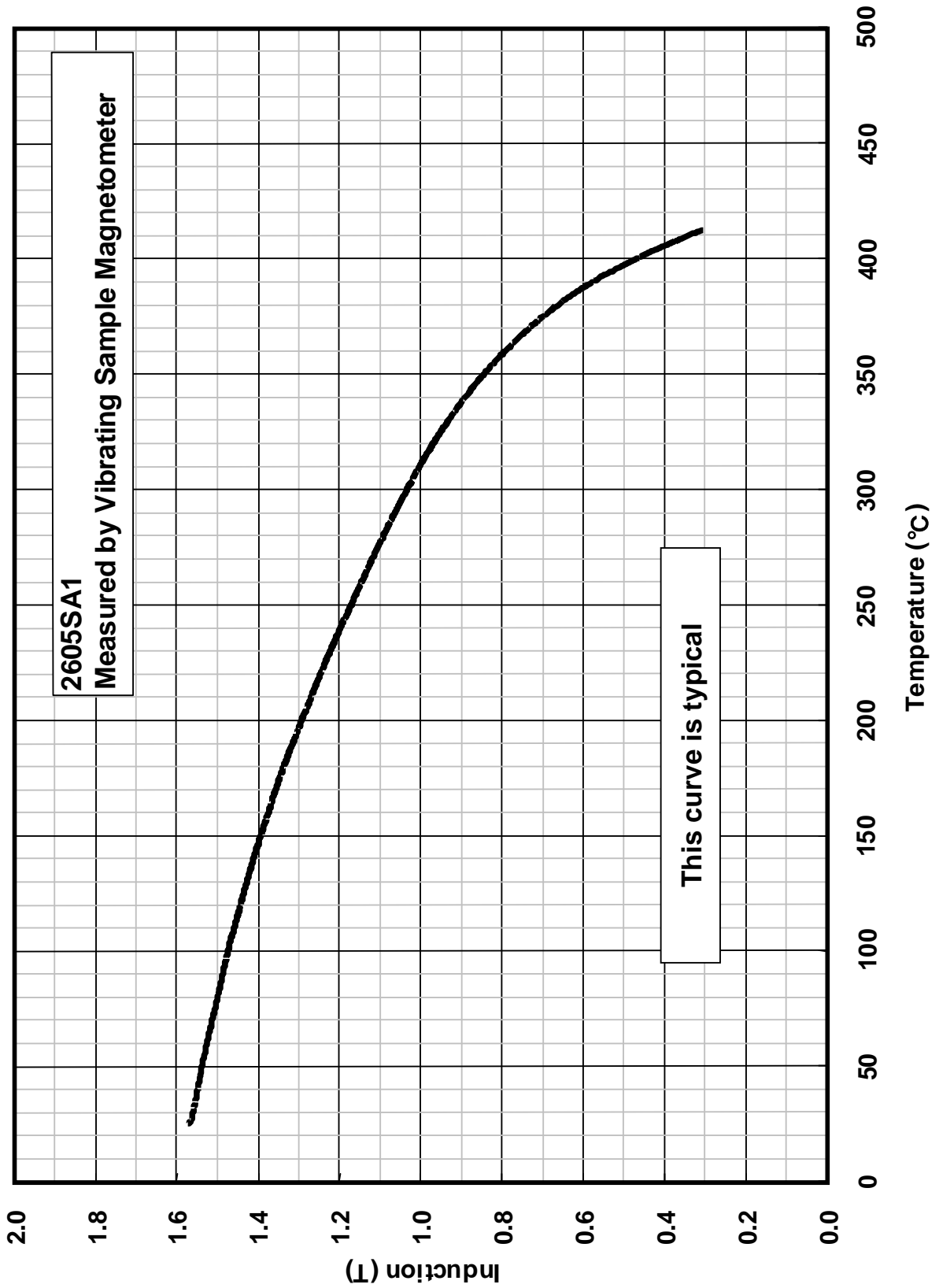
In the following pages some examples of the properties on 2605SA1 and 2605HB1M transformer core alloys are shown. AC magnetic properties were measured by 25 cm Epstein test frame method. DC hysteresis curves were measured by a Single Strip Test method. The samples were 25.4 mm wide and 200 mm long. The heat treatment of the samples were performed at 370 $^{\circ}\text{C}$ for 2 hours for 2605SA1 alloy and at 340 $^{\circ}\text{C}$ for 2 hours for 2605HB1M alloy in a magnetic field of 2400 A/m directed along the long axis of the ribbon to release stress and induce the magnetic anisotropy along the long axis of the ribbon. These properties are not guaranteed.

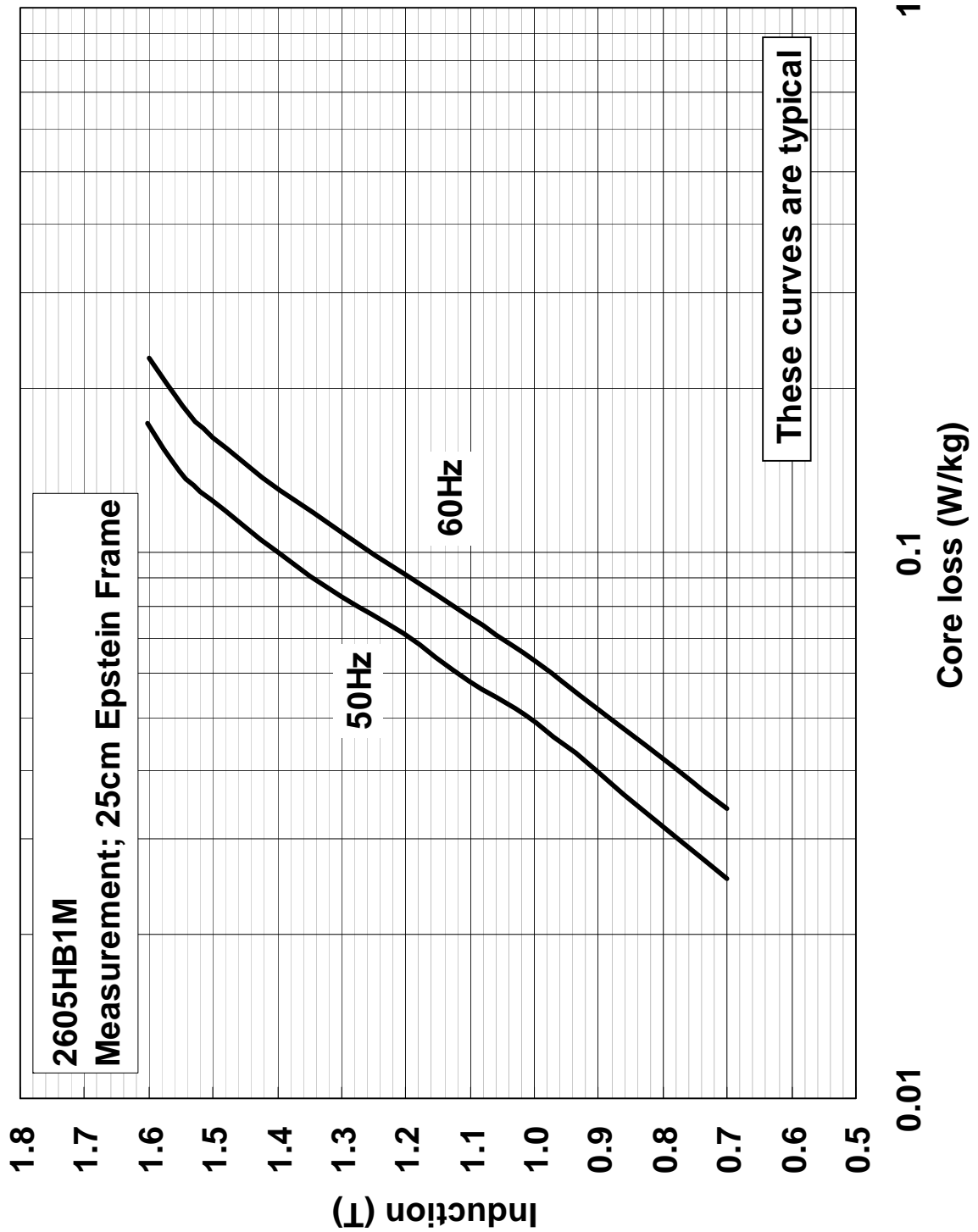


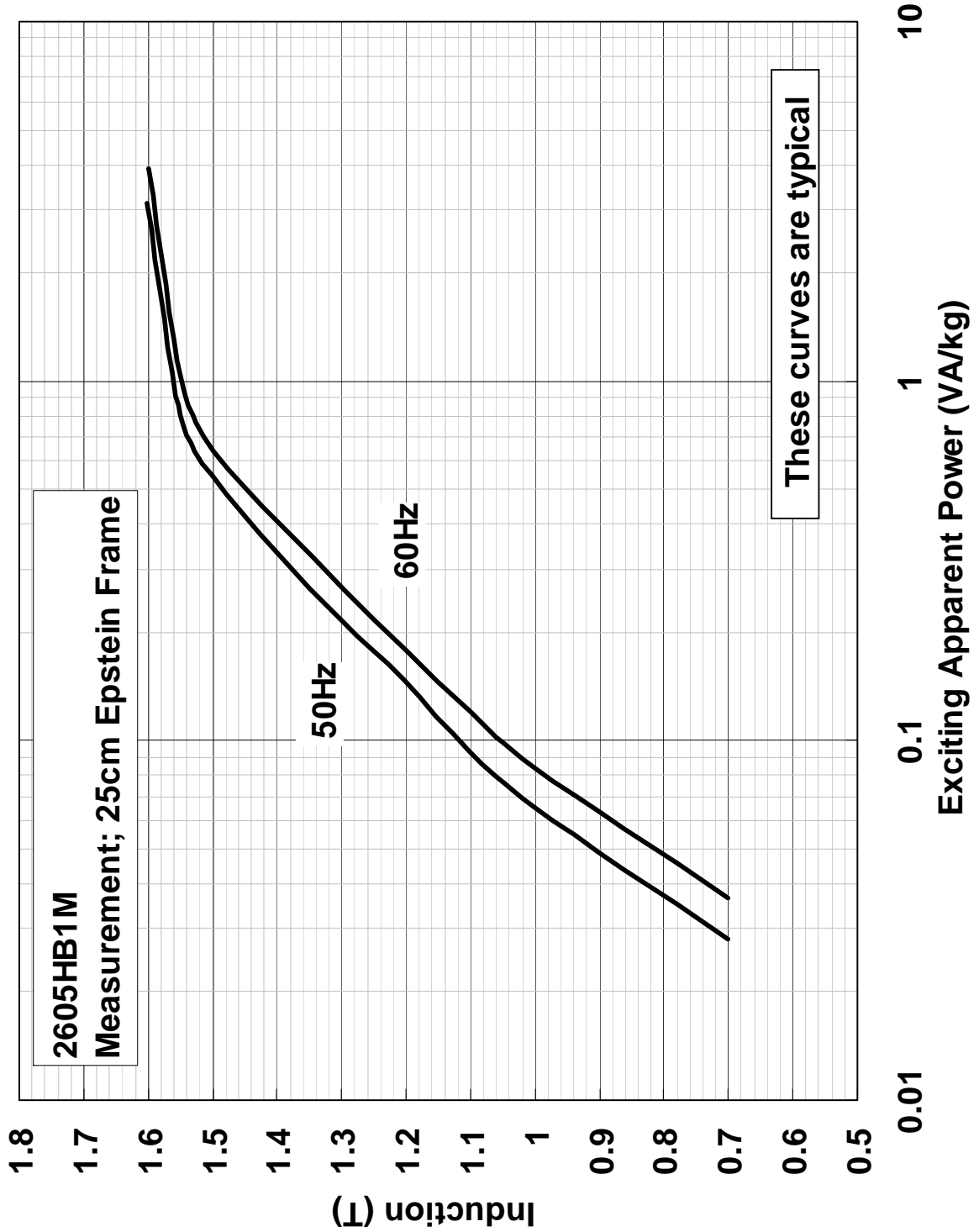


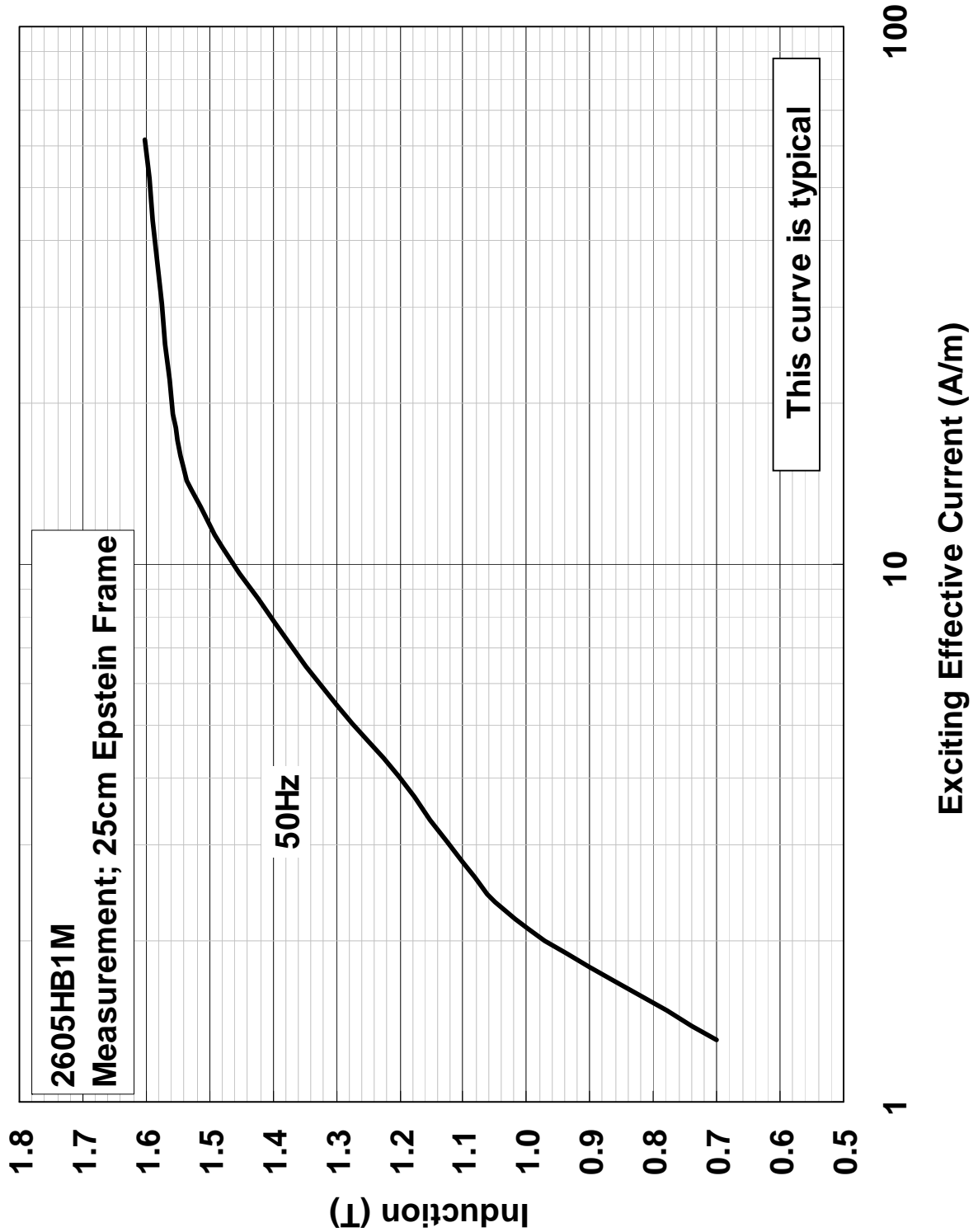


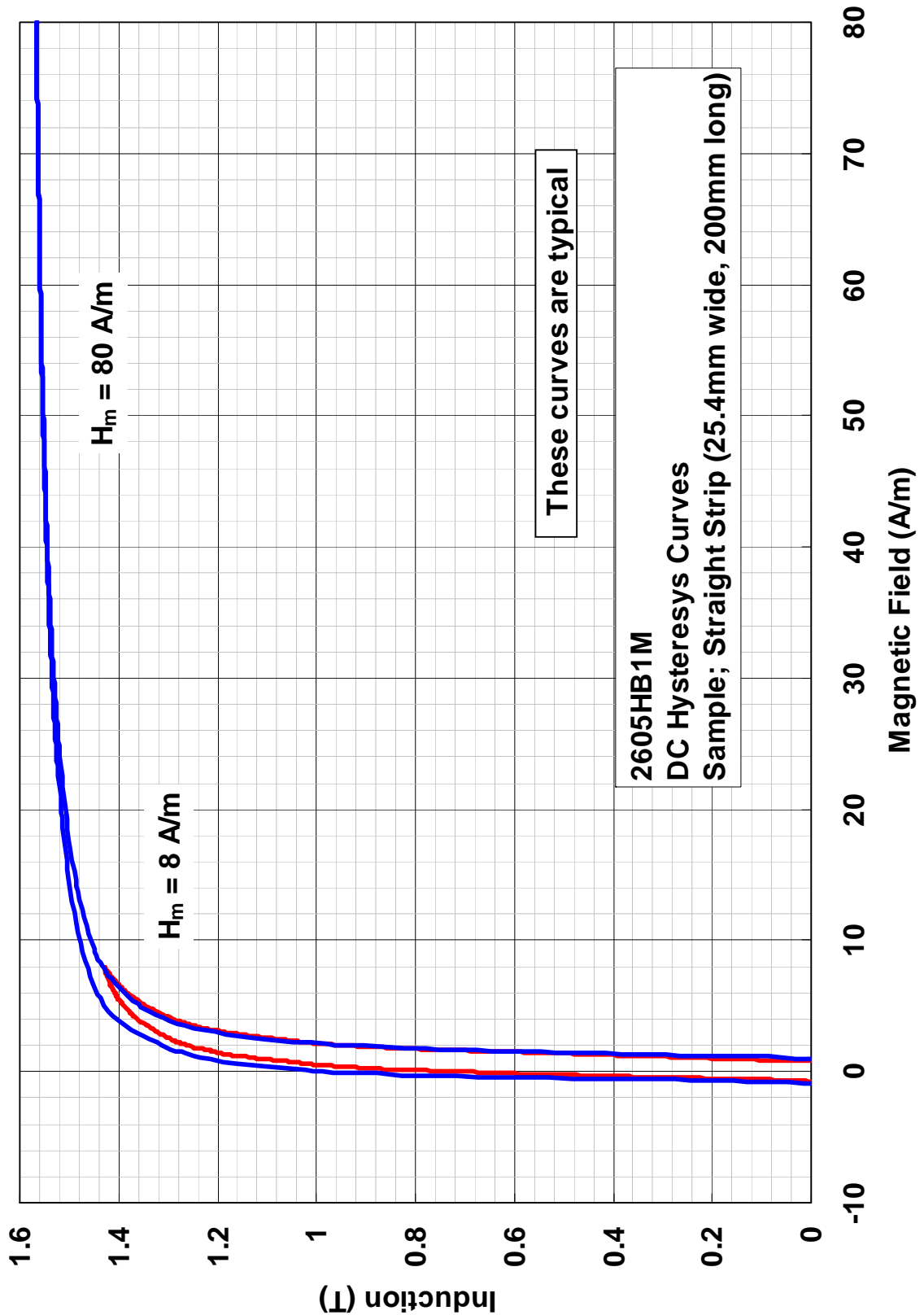


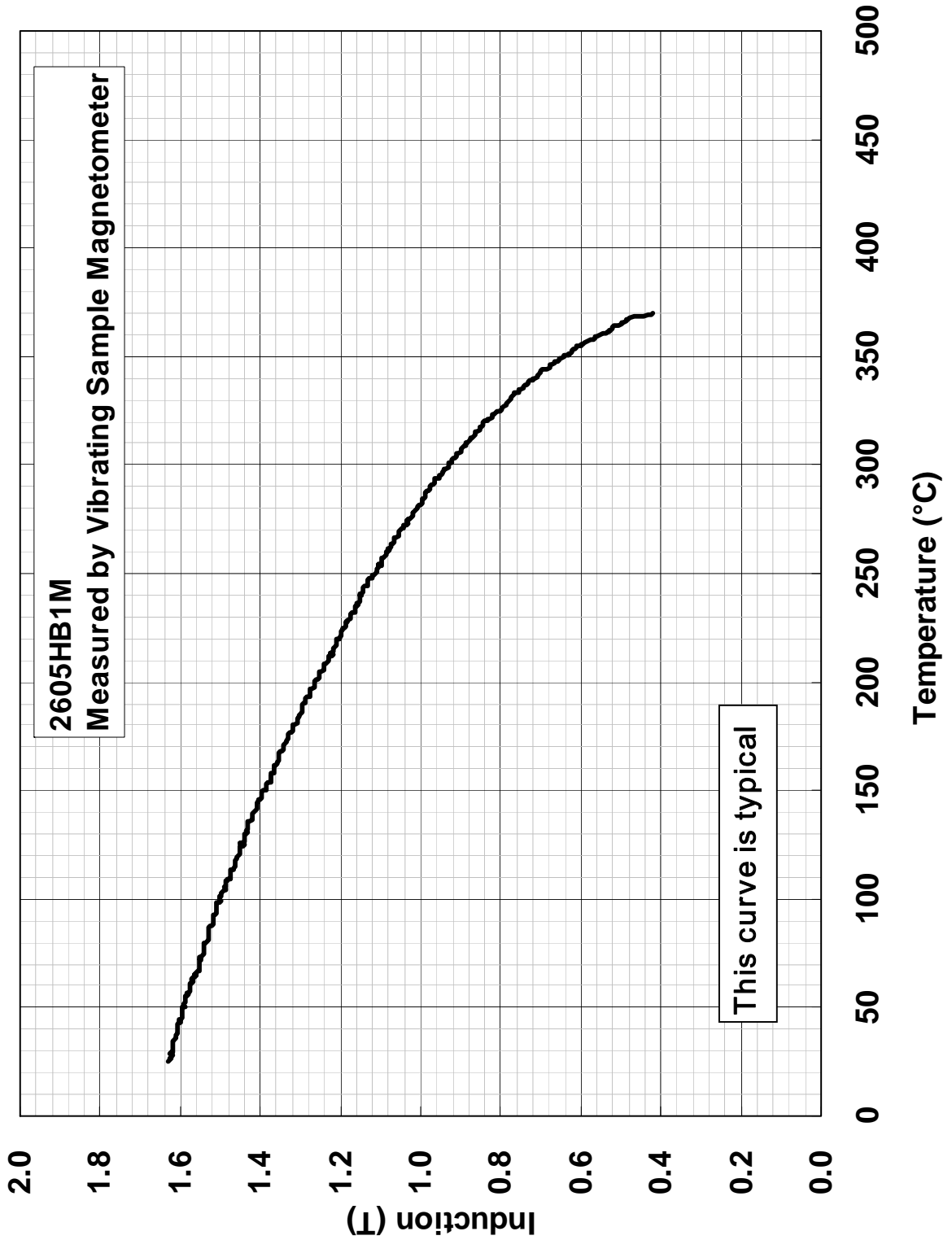












5. Typical Magnetic Properties of Transformer core

Some examples of the properties on 2605SA1 and 2605HB1M transformer cores are shown. They were annealed at 350°C for 1 hour for 2605SA1 core and at 320 °C for 1 hour for 2605HB1M core. These properties are not guaranteed.

