

## Testing and calibrating of magnetic materials

<b>Electrical sheet steel</b>			
<b>Quantity</b>	<b>Range</b>	<b>Conditions of measurement</b>	<b>Relative uncertainty</b>
<b>Defaults:</b>	<b>16 Hz to 400 Hz 0,5 T to 1,9 T</b>	<b>in alternating field</b>  <b>25 cm- Epstein-and ring specimen</b>	
specific total loss	0,1 W/kg to 100 W/kg		$1 \cdot 10^{-3}$ to $2 \cdot 10^{-2}$
peak value of the polarization	0,1 T to 1,9 T		$5 \cdot 10^{-4}$ to $1 \cdot 10^{-3}$
peak value of the magnetic field strength	5 A/m to $1 \cdot 10^4$ A/m		$5 \cdot 10^{-4}$ to $1 \cdot 10^{-2}$
r.m.s-value of the magnetic field strength	3,5 A/m to 3000 A/m		$8 \cdot 10^{-4}$ to $1 \cdot 10^{-2}$
specific apparent power	0,2 VA/KG to 350 VA/kg		$2 \cdot 10^{-3}$ to $5 \cdot 10^{-2}$
<b>Defaults:</b>	<b>16 Hz to 60 Hz 0,5 T to 1,8 T</b>	<b>in alternating field</b>  <b>single sheet</b>	
specific total loss	0,1 W/kg to 10 W/kg		$5 \cdot 10^{-3}$ to $2 \cdot 10^{-2}$
peak value of the polarization	0,5 to 1,8 T		$1 \cdot 10^{-3}$ to $1 \cdot 10^{-2}$
peak value of the magnetic field strength	10 A/m to $5 \cdot 10^3$ A/m		$1 \cdot 10^{-3}$ to $2 \cdot 10^{-2}$
r.m.s-value of the magnetic field strength	7 A/m to $1,5 \cdot 10^3$ A/m		$8 \cdot 10^{-4}$ to $1 \cdot 10^{-2}$
specific apparent power	0,4 VA/kg to 200 VA/kg		$2 \cdot 10^{-3}$ to $5 \cdot 10^{-2}$

# Magnetic Measurements

<b>Bulk soft magnetic materials</b>			
<b>Quantity</b>	<b>Range</b>	<b>Conditions of measurement</b>	<b>Relative uncertainty</b>
coercive field strength	0,2 A/m to 20.000 A/m	rods	$1 \cdot 10^{-2}$
saturation polarization	< 1 T	Sale of Ni reference samples (annealed)	$\sim 1 \cdot 10^{-3}$
<b>Feeble magnetic materials</b>			
<b>Quantity</b>	<b>Range</b>	<b>Conditions of measurement</b>	<b>Relative uncertainty</b>
Susceptibility	1 to $1 \cdot 10^{-4}$ $1 \cdot 10^{-4}$ to $1 \cdot 10^{-6}$	<p>in dc-field <math>H \leq 5000 \text{ A/m}</math></p> <p>sample shape:</p> <ul style="list-style-type: none"> <li>• rods 100 mm long diameter 10 mm</li> <li>• cylinder: 150 mm long diameter 35 mm</li> <li>• arbitrary sample shape: max. diameter : 55 mm</li> </ul>	$2 \cdot 10^{-3}$ to $1 \cdot 10^{-2}$ $1 \cdot 10^{-2}$ to $5 \cdot 10^{-2}$

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## **Coercivity measuring setup**

*Materials with coercivities below 40 A/m are increasingly used in industrial applications such as relay switches, circuit breakers, and electromechanical converters. To ensure accurate measurements in this very low coercivity region, PTB offers a coercimeter with a new type of compensation for the earth's magnetic field.*

