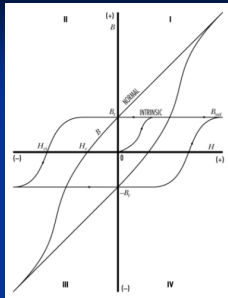


# Magnetic Testing of Bonded Magnets

S. R. Trout  
 Spontaneous Materials  
 NATO/ARW Conference on Bonded Magnets  
 Newark, DE, USA  
 August 22 and 23, 2002

## Methods

- Vibrating Sample Magnetometer
- Pulsed Field Magnetometer
- Hysteresisgraph
- Potential Coil
- Helmholtz Coil
- Polanzeiger
- Search Coil
- Magnet Viewer
- Hall Probe
- Fixture Test



## Vibrating Sample Magnetometer

- Advantages
  - Sensitive & accurate
  - Variable temperature
  - Most of 2<sup>nd</sup> quadrant
  - Suitable for powder
- Disadvantages
  - Weight & density
  - Self-demagnetization
  - Limited field
  - Destructive



Lake Shore Cryotronics, Inc.

## Hysteresisgraph

- Advantages
  - Any thin sample
  - No self-demagnetization
  - Higher field than VSM
  - Most of 2<sup>nd</sup> quadrant
- Disadvantages
  - Destructive
  - Slow

Walker Scientific, Inc.

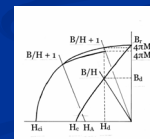


Magnet Physik Dr. Steingroever GmbH

## Helmholtz Coil

- Advantages
  - Fast & easy
  - Many sizes
  - Accurate
  - Non-destructive
  - Inexpensive
- Disadvantages
  - Single point
  - No multi-pole magnets
  - Requires known volume
  - Self-demagnetization

Magnetic Instrumentation, Inc.



## Search Coil

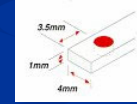
- Advantages
  - Simple and fast
- Disadvantages
  - A coil for each size
  - Single point measurement



Magnet Physik Dr. Steingroever GmbH

## Hall Probe

- Advantages
  - Fast & easy
  - Inexpensive
  - Non-destructive
- Disadvantages
  - Easy to misinterpret
  - Single point measurement



Hirst Magnetic Instruments, Ltd.

## Fixture Test

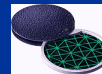
- Advantages
  - Measurement closest to actual usage
- Disadvantages
  - Difficult to relate to magnet properties
  - Other component affect result
  - Comparisons impossible



Tengam Engineering, Inc.

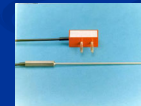
## Less Common Methods

Pulsed Field Magnetometer  
Hirst Magnetic Instruments, Ltd.



Magnet Viewer  
Magne-Rite, Inc.

Polanzeiger  
Thyssen Magnet und Komponententechnik



Potential Coil  
Magnet Physik Dr. Steingroever GmbH

## Preferred Methods

Powders	Magnets	Assemblies
VSM PFM	Hysteresisgraph VSM Helmholtz Coil Search Coil PFM Potential Coil Hall Probe	Fixture Test Hall Probe Potential Coil