

MATr - Up to 10 Tesla Magnetic Annealing Tool

Process Development & Low Volume Production

The Magnetic Solutions MATr offers a range of flexible magnetic annealing tools for process development and low volume production. The tool is provided in three configurations with magnetic fields up to 10 Tesla (MATr10000), 5 Tesla (MATr5000) and 2 Tesla (MATr2000).

MATr tools incorporate Magnetic Solutions patented oven technology with high accuracy thermal control to within 1 °C in a clean processing environment. Reproducible process development is achieved with a median loss oven design that provides the flexibility to accurately control ramp rates, overshoot, settling times, set point accuracy and thermal uniformity at soak.

A closed cycle superconducting magnet provides a fully variable magnetic field in a compact package. Active magnetic shielding is used to minimize the mass and stray field footprint of the tool, making it suitable for installation in laboratory environments.

MATr tools are used for a wide range of applications including;

- *MRAM and spintronic devices*
- *Thin film heads for disk drives*
- *Magnetic sensors*
- *Patterned media*
- *Magnetocaloric materials*
- *High permeability alloys for transformer and inductor applications*

Tool Layout

Enclosure cut away for clarity of presentation

Quartz lined vacuum oven with multi-zone heating elements and dual chamber design. Provides low contamination environment and high process throughput

Closed cycle superconducting magnet. Compact design with active magnetic shielding

EFEM for automated wafer load/unload and pre-alignment to <0.1 degrees. Automated loading for other product types can be provided, subject to customer requirements

Sample transfer stage. Can be configured for customers sample requirements

Touch screen operator interface

The tool can be supplied in a wide range of configurations suitable for efficient batch processing of sample types including; wafers, coupons, media platters and metallic ingots. A range of options are provided that allow the customer to match their process needs and budget with the tool configuration.

Specification Summary

Batch configuration options: 10 x up to 200mm Si / AlTiC wafers
 Mounting fixtures for customer specific product can be provided

Sample orientation: In plane or transverse to the magnetic field direction
Option for in process wafer positioning -180° to +180°

Magnetic field range: Up to 10.0 Tesla variable - MATr10000
 Up to 5.0 Tesla variable - MATr5000
 Up to 2.0 Tesla variable - MATr2000

Magnet type: Closed loop superconducting magnet
 Magnetic homogeneity: +/- 2 %
 Magnetic uniformity: +/- 1 degree
 Magnetic set-point accuracy: < 5 mTesla
 Stray field: < 0.5 mTesla at 1 m from tool

Thermal range: 150 – 400 °C
Option to extend to 600 °C

Ramp rate: Up to 8 °C/min
 Set-point accuracy: 1 °C
 Thermal uniformity: +/- 2 °C

Vacuum range: 2 torr to <5E-7 torr
 Gas: Up to 4 process gasses
 Contamination monitoring and control: Automated ROR check
*Options for; Gas line filters and Oxygen scrubbers
 RGA fitted to process chamber*

Wafer loading:: Automated via EFEM
*Option for manual loading
 Option for continuous feed sample handling*

Load-port capacity: 2 x 25 wafer manual load cassette
 Wafer alignment: <0.1 degrees by automated prealigner
*Options for ; SMIF load ports
 Wafer bar code reader
 OCR reader*

Certifications: SEMI S2 /S8
 CE
 Seismic zone 4

Connectivity: SECS/GEM capable

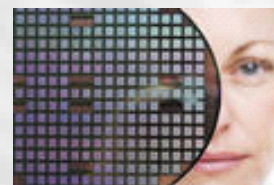
Installation configuration: Bay/Chase or ballroom to class 10

Performance metrics:
 > MTBF > 2,000 hrs
 > MWBF > 2,000
 > Uptime > 97%

Installation Worldwide by Magnetic Solutions Ltd

Warranty 2 year warranty provided

Lead-time 18-32 weeks subject to tool configuration and PO timing



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