VacTechniche
PROBLEM SOLVED

High Vacuum Thermal Evaporator – DTE



DTE

High Vacuum Thermal Evaporator

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Disclaimer

The components and packages described in this document are mutually compatible and guaranteed to meet or exceed the published performance specifications. No performance guarantees, however, can be given in circumstances where these component packages are used in conjunction with equipment supplied by companies other than VacTechniche Ltd.

High Vacuum Thermal Evaporator DTE

DTE is a desktop thermal evaporator system to deposit thin layers of materials on the substrate for research purposes and investigation by electron microscopy. DTE is configured as a material evaporator suitable for sample evaporant experiments. This low-budget, small chamber, and high-vacuum device is ideal for short time deposition of noble and oxidizing metals.



Thermal Evaporation

DTE is equipped with a high current power supply and low-voltage (Resistive) thermal evaporation platform suitable for a wide variety of thermal evaporation applications. The system allows controlled thermal evaporation of a wide range of materials onto the substrate. Different types of thermal evaporation sources (Boat, basket, and coil) can be installed on the single thermal source holder.

The system is equipped with a 1.2 kW high-current DC power supply, which empowers deposition of a thin layer of the evaporant material on different surfaces for different applications, such as SEM sample preparation.

Features

Hardware:

- **DC high-current power supply (Max. 12 V, 100 A)**
- **170 mm diameter Borosilicate-SST vacuum chamber**
- **High vacuum level with built-in turbo pump (Leybold 90 l/s)**
- **Two-stage rotary (Optional diaphragm or scroll) backing pump**
- **Quartz crystal monitoring system for real time thickness measurement (1 nm precision)**
- **Electronic shutter**
- **Two high-current electric feed-throughs for thermal source insertion**
- **Movable thermal source holder with possible upward or downward deposition configurations**
- **Automatic venting valve**
- **Full range vacuum gauge**
- **S-Clip sample holder on the chamber's lid**
- **2-inch rotating sample holder on the base plate (Optional)**
- **Sample rotation, height, and tilt adjustable (For optional 2-inch sample holder)**
- **Two-year warranty**
- **CE conformity**

Automation:

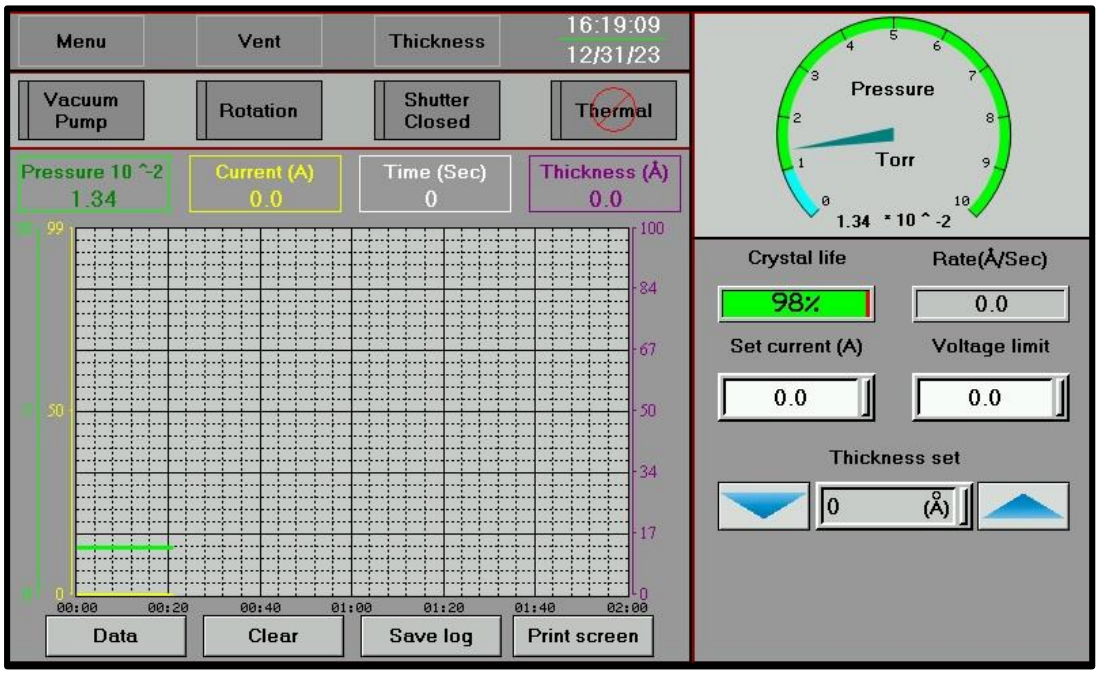
- **Intuitive touch screen to control the vacuuming process and device manipulation**
- **User friendly software, updatable via network**
- **Semi-automatic evaporation process control**
- **Controlled thin film deposition based on the set thickness**
- **Records and plots coating parameters graphs**

Clean Vacuum

The vacuum chamber consists of a portable cylindrical Pyrex. The DTE is fitted with an internally mounted 90 L/s turbo molecular pump, that can be backed by a 6 m^3/h two-stage rotary vane pump (optionally supplied by the manufacturer), or a scroll or diaphragm pump (based on the customer choice). It introduces clean vacuum without oil contamination which normally exists with ordinary diffusion pump.

Touch Screen Control

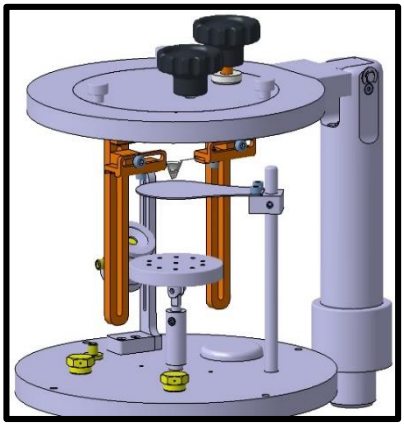
DTE is equipped with a 7" colored touch-screen panel using user-friendly software to control the deposition process data. The vacuum and coating sequence information can be observed as digital data or curves on the touch screen and the last 300 coatings are saved on the history page.

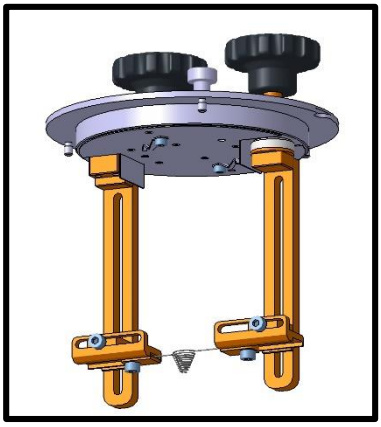


Sample Holder Stages

DTE deposition system enables metal evaporation in upward and downward configurations.

- **Upward deposition: The material is loaded in a boat source and the sample is attached to the S-Clips on the chamber lead to allow easy access.**
- **Downward deposition: A small amount of desired material is loaded in the basket with rotating sample holder (Optional) on the baseplate.**





DTE Operation Requirements

DTE is a deposition system with a small chamber, making it a compact, light-weight, quick-vacuuming, and low-budget coating device. Although, due to its small chamber, there are some advisory notes regarding this device:

- **DTE is ideal for short-term thin film coatings, whereas long-term thick layer depositions may damage the chamber.**
- **The device is ideal for deposition of source materials with low vaporization temperature.**
- **The maximum sample diameter could not exceed 2 inches for rotating substrate holder.**

If these coating conditions do not suit your purpose, you can try our DTT model with a large 300 mm Dia. chamber and three-thermal sources.

Applications

- **Metal thin films**
- **Nano and microelectronic**
- **Solar cell applications**

- **Thin film sensors**
- **Fine grain structural deposition of metals for SEM, FE-SEM, EDX, and TEM sample preparation**
- **Carbon fiber evaporation in flash mode for SEM sample preparation**
- **TEM grid/aperture cleaning**

Specifications

- **Fast-cycle deposition process**
- **Real-time plot of coating parameters**
- **Max power consumption: 1.2 kW**

Options and Accessories

- **Quartz crystal sensor**
- **Spare glass chamber**
- **Sealing gaskets**
- **Source boats and baskets**
- **Glow discharge plasma**

Detailed Features

Dimensions	450 × 620 × 480 mm (H × W × D)
Weight	36 Kg (without backing pump)
Vacuum Chamber Dimension	Borosilicate Glass, 170 mm Dia.× 50 mm Height SST, 170 mm Dia. × 90 mm Height
Display Screen	7" Diagonal (16:9) 800×480 High Color- Graphic TFT- LCD
Data Transfer	USB Port – For Transferring the data and graph to PC
Evaporator filament: boat/basket	**Boat:** max. 1 mm thickness, max. 8 mm width, 30-65 mm length **Basket:** Single wire with 0.5-0.8 mm Dia.
Sample Holder Dimension	Standard holder with 50 mm Dia., can contain: • 16×9.6 mm stubs or • 9×12.7 mm stubs or • 4×19 mm stubs
Chamber's Lid	Made of Aluminum/SST with high-current feedthroughs and source holder extensions.
Thickness Sensor	
Specification	Crystal thickness gauge with sensor, Gold coated crystal quartz for deposition thickness monitoring, oscillator
Resolution	±1 Angstrom
Accuracy	±1 nanometer
Vacuum Equipment	
Turbo Molecular Pump	Pumping Speed of 90 L/s, (Leybold)
Backing Pump	Two-stage rotary vane/diaphragm pump/scroll pump
Pressure Gauge	Leybold (Ionivac model); Full Range
Final Vacuum	$<5x10^{-6}$ Torr
Process	
Metal Evaporation	Small amounts of metal loaded in the boat/basket/coil is evaporated.
Glow Discharge Plasma (Optional)	• TEM grid plasma treatment • Enhancing surface hydrophilicity • SEM/TEM aperture cleaning
Service and other Information	
Electric Power Supply	High current: 12V, 100A
Venting Valve	Electronic leak valve
Shutter	1 piece
Electrical Inlet	Inlet: 220-240V, or 110V , 50/60Hz *

*** Single-phase AC power with appropriate earth connection is required.**