



1 Torr = 1 mm Hg

Electron Beam Evaporation

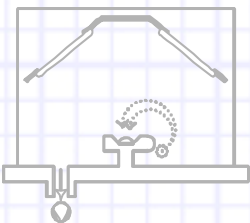


Affordable E-Beam Evaporation EB-4P Series

The Torr EB-4P series is the new generation E-Beam Deposition system. Highly practical, low cost, and highly reliable systems are the future as we know it today. The EB-4P systems all have four pocket crucibles ranging from 2cc up to 60cc, and have power sources ranging from 3Kw to 10 Kw or more.

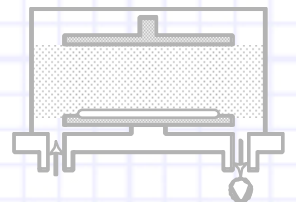
The EB-4P series e-beam systems are specially tailored for lab/R&D research, pilot production, university research, and even small scale production. Their compact construction and small footprint make them ideal for clean room applications.

Torr EB-4P systems are ideal for depositing metals, oxides, magnetic materials, and dielectrics. Typical applications are nanotechnology, optics, microscopy, MBE, functional and decorative coatings.



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TORR INTERNATIONAL, INC.
Thin Film & Nanotechnology



E-Beam Evaporation Systems

The Torr International, Inc. E-beam Evaporation System is completely customizable, and the chamber can be designed to accept additional evaporation sources later. The unused ports are blocked off with flanges to allow future additions to your Torr system. Then later when you are ready, you can add a thermal resistance source or maybe expand your capabilities by adding DC & RF sputtering or etching. Torr International, Inc. can produce any custom system that you desire. Call to discuss what functionality you require and your system will be designed to fit your process, your budget, and your future.

E-Beam Deposition Rates

Distance: source target to sample = 10"

Materials	Angstroms/ Second	Milliamps Current
Al ₂ O ₃	8	100
Aluminum (Al)	4.5	500
Chromium (Cr)	13	50
Cobalt (Co)	9	200
Copper (Cu)	2.2	500
Germanium (Ge)	3	300
Hafnium (Hf)	7	250
HfO ₂	9.0	150
Indium (In)	18	200
ITO	10	20
MgF ₂	7.0	10
Molybdenum (Mo)	8.5	500
Nickel (Ni)	3	300
Niobium (Nb)	1	500
Palladium (Pd)	50	100
Silicon (Si)	1	300
Silver (Ag)	13	150
SiO ₂	25.0	40
Ta ₂ O ₅	7.0	150
Tantalum (Ta)	8	500
TiO ₂	7.5	150
Titanium (Ti)	20	300
Tungsten (W)	8.0	500
Yttrium (Y)	40	150
ZnS	10.0	30
ZnSe	40	10
ZrO ₂	10	200

Note: All data is based on measurements using the specified power outputs and distance from the crucible to the sample. These figures are intended to be a basic guideline and the numbers can be easily decreased or increased by changing the system parameters and the environment variables.

- **Excellent Film Quality**

From a few angstroms to a few microns thick, Torr e-beam systems produce uniform, adherent thin films of many materials. E-beam evaporation produces excellent rate control deposition with low contamination, and include multiple axis rotation capability for the best uniformity possible on any size or shape sample.

- **Highly Versatile and Economical**

A wide variety of materials can be deposited, and your Torr system can be expanded later on to include other evaporation sources as well. The vacuum chamber can be designed with additional ports for future use that are sealed off until you are ready to upgrade. Taking advantage of this Torr design feature can help your budget go farther and save your department many thousands of dollars and precious lab space.

- **Process Efficiency**

High deposition rates at moderate power levels can be achieved. When utilizing optional crucible liners, you can reclaim your precious materials and save time cleaning the source. All displays and readouts are conveniently located on the front of the cabinet, and complete control over process variables gives the Torr system capabilities not found in some other systems.

- **Low Maintenance**

The process chamber and stage assembly are all composed of long lasting construction. The turbomolecular pump needs zero maintenance while the external mechanical pump just requires routine oil changes. The entire system is constructed of long life vacuum components. And Torr will service all of its products.

- **Many Options Available**

Choose a different chamber size, stage size, stage heating, water or multi coolant stage, stage rotation and tilt, power supply, dry rotary vane pump, extended warranties and more. All systems are custom built to your specifications and budget.

E-BEAM EVAPORATION SYSTEM - STANDARD SPECIFICATIONS

VACUUM CHAMBER: Stainless Steel box chamber with full opening front door and 4" view port

VACUUM SYSTEM: Turbomolecular vacuum pump system with rotary pump and all necessary valves and fittings to achieve 10⁻⁷ Torr vacuum

VACUUM READOUT: Digital display full range vacuum gauge

SAMPLE STAGE: 8" diameter or smaller substrate stage

VENTING SYSTEM: Dry N₂ system for chamber venting

E-BEAM SOURCE: Single or multiple pocket, 2 cc e-beam source

POWER SUPPLY: 3 kW high voltage solid state power supply

X-Y SWEEP: Adjustable and variable sweep pattern controller

THICKNESS MONITOR: Quartz crystal rate/thickness monitor with deposition rate controller

DIMENSIONS: As small as 24" x 24" x 5' high with an external rotary pump

WEIGHT: Approximately 500 lbs. and greater

WARRANTY: One year for both parts and labor

DELIVERY TIME: As little as 8 weeks from time of order

AVAILABLE OPTIONS

PROCESS CHAMBER: Additional View ports & larger dimensions available

VACUUM SYSTEM: 300 - 3000 l/sec, turbo or cryopump, dry or oil rotary pump

VACUUM GAGE: Cold cathode or hot cathode ionization gauge

POWER SUPPLY: 3, 6 or 10 kW at 10 kV with 2, 6, 16 cc or more crucible volume

SUBSTRATE STAGE: Any size available, adjustable height

STAGE TILT & ROTATION: Azimuthal and polar rotation, external or in vacuum stepper Motors

STAGE HEATING: Quartz lamp heater up to 800 degrees Celsius.

THICKNESS MONITOR: Choose quartz crystal or optical thickness monitor

AUTOMATIC CONTROL: Completely PC compatible

EXTENDED WARRANTY: Renewable extended warranties available for any term

Contact us today for additional details.



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