

VACUUM DEPOSITION SYSTEM

SAF EM

Technical Specification

Sidrabe, Inc
17 Krustpils Street
Riga, LV-1073
Latvia

Phone: +371 67249806
Fax: +371 67139506
E-mail: sidrabe@sidrabe.eu
www.sidrabe.com



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1. Overview

Vacuum coater SAF EM is an R&D tool for deposition of various multifunctional coatings by magnetron sputtering and thermal evaporation methods. The substrate is 50x50 or 25x25mm solid, flat material that is suitable for vacuum coating. This equipment is designed for scientific research and development works.

Vacuum coater SAF EM is a single-chamber solution based on SAF multifunctional R&D cluster tool concept (<http://www.sidrabe.com/cluster-tool>).



2. Specification

2.1. Safety engineering

The coater is designed in accordance with ergonomic principles that ensure access to all parts of the coater for maintenance or replacement. All the equipment is suited for the specific processes within the limits of temperature, pressure and reactive medium requirements.

The coater is built in accordance with the safety regulations of the European Commission and European Standards:

- 2006/42/EC (Machinery Directive);
- 2006/95/EC (Low Voltage Directive);
- EN60204-1:2006+A1:2009 (Safety of Machinery).

The power supplies, electric components and the entire coater have CE marking.

2.2. Electric power

Frequency	50Hz/PEN
Voltage	3x400VAC
Power	10kW

2.3. Gases

Process gases	Ar
Air pressure	0.5...0.7MPa

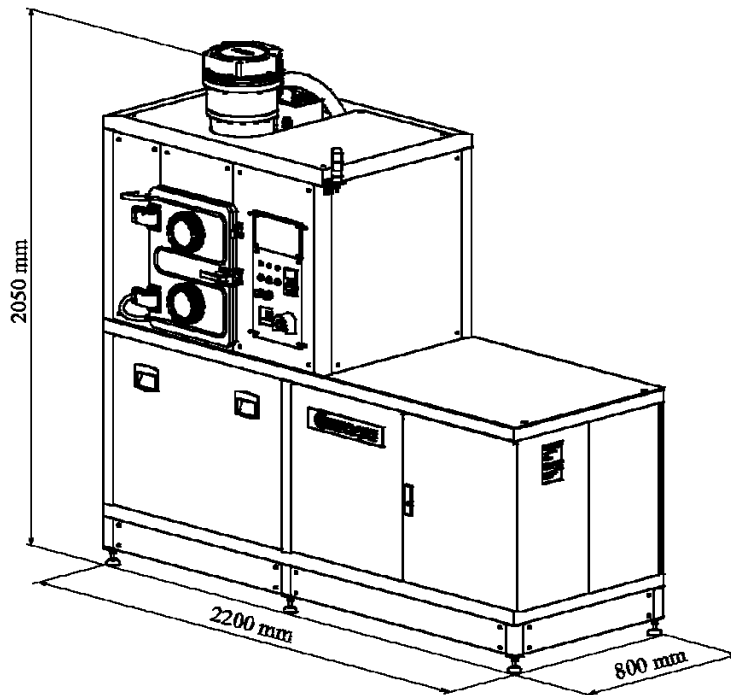
2.4. Water

Water inlet	10l/min (0.6m ³ /h)
Water pressure	0.25...0.3MPa

2.5. Dimensions of the vacuum chamber (C-shaped stainless steel chamber)

Diameter, mm	520
Height, mm	700

2.6. Dimensions of the coater



2.7. Sample

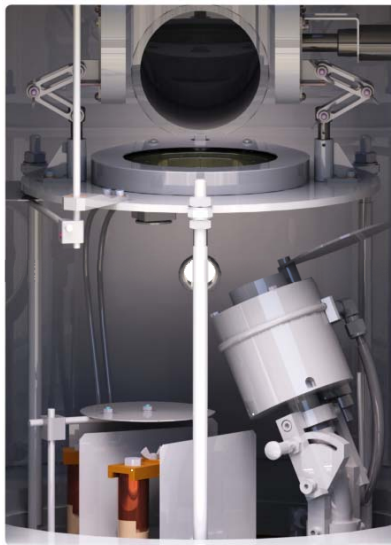
2.7.1. Dimensions and properties of the sample

Material	Glass, metal, or other solid, flat sample, suitable for vacuum process
Dimensions, mm	25 x 25 and 50 x 50
Thickness, mm	1-20
Uncoated area, mm	Up to 1.5 from each side

2.7.2. Sampleholder

Material	Copper (St.St., optional)
Dimensions, mm	84 x 84 x 1 (may be changed if necessary)

2.8. Process chamber



2.8.1. Coating



Material for evaporation	Au, Ag, Al, Pd, Cu, Ni, etc.
Material for magnetron sputtering	oxides, nitrides, carbon
Uniformity of the coating	± 5 %

2.8.2. Magnetron sputtering

Sputter magnetron	1 pc.
Circular target	Ø 2"
Changeable magnetron tilt relative to the substrate	± 30 degrees
Power supply with match box	1 pc.
Gas feeding system	

2.8.3. Thermal evaporation

Evaporator type	Resistive evaporators
Evaporator quantity, pc	4
Shield quantity, pc.	1
Volume of crucible	1.2 cm ³
Ultimate pressure, Torr	1x10 ⁻⁶
Base pressure, Torr	2x10 ⁻⁶
Process pressure, Torr	1x10 ⁻⁵
Evaporator power supply, pc.	1

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ISO 9001:2008; ISO 14001:2004		Sidrabe Confidential

Evaporation temperature, °C	Up to 1500
Distance from evaporator to the center of the sample, mm	100...300
Boron nitride crucible, pc	5
Aluminum oxide crucible, pc	5
Quartz crucible, pc	5
Molybdenum boats (if boat resistive evaporators are included)	20
Wolfram boats (if boat resistive evaporators are included)	20

2.8.4. Sample heater



Sample temperature, °C	200 deg MAX
Heater type	IR heater
Heater qnty, pc.	1
Maximal heater output, W	500
Temperature measurement device, pc.	1

2.8.5. Evaporation control

Quartz film thickness monitor, pc.	2 (1 piece for 2 evaporators)
Quartz crystals for resonators, pc	10
Measurement precision, Å/s	≤ 0,1

2.9. Control

Pumping station is controlled by touch panel. Control of other equipment is manufacturer dependant.

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3. List of components

- 3.1. Process chamber
 - 3.1.1. Chamber door with two view ports 1 pc.
 - 3.1.2. Flanges with blanks 4 pc.
 - 3.1.3. Flanges with optical window 2 pc.
 - 3.1.4. Sample holder, rotatable, for 1 sample with a possibility to place a mask 1 pc.
 - 3.1.5. Thermal evaporator 4 pc.
 - 3.1.6. Sputter magnetron (Gencoa) 1 pc.
 - 3.1.7. Bdiscom 200RF AFP power supply with match box BDS AMN750 1 pc.
 - 3.1.8. Gas feeding system 1 pc.
 - 3.1.9. Quartz film thickness monitor 2 pc.
 - 3.1.10. Sample heater (optional)
 - 3.1.11. Air inlet valve 1 pc.
 - 3.1.12. Pumping:
 - 3.1.12.1. Fore vacuum pump (DUO20 two-stage mechanical pump (ISO KF 25), Pfeiffer Vacuum or similar from different manufacturer) 1 pc.
 - 3.1.12.2. Turbo pump (HiPace 700 turbomolecular pump DN 160 ISO-K, Pfeiffer Vacuum) 1 pc.
 - 3.1.12.3. Filter DN 16 1 pc.
 - 3.1.12.4. Silencer (ES 25S P/N109873, Alcatel) 1 pc.
 - 3.1.12.5. Throttling valve (TBV-G-600-ISO-160, Nor-Cal) 1 pc.
 - 3.1.12.6. Pneumatic valve (GVMP-4001-CF, Nor-Cal) 1 pc.
 - 3.1.12.7. EM Valve (XSA3-43S-5DZ-Q, 24 VDC, SMC) 2 pc.
 - 3.1.12.8. Angle valve (XLAV-25J-A90LA-5LU, SMC) 2 pc.
 - 3.1.12.9. Cold cathode vacuum sensor (KJLC 971, NW25 KF, Kurt J.Lesker) 1 pc.
 - 3.1.12.10. Digital Pirani type vacuum sensor Digital Pirani sensor (PPT100 DN16 ISO-KF, Pfeiffer Vacuum) 2 pc.
 - 3.1.12.11. Capacitance diaphragm vacuum gauge (100C Heated CDG 100-M11-NW1 (DN16 ISO-KF), Nor-Cal) 1 pc.
 - 3.1.13. Inner lights