Typical Dimensions
SMART CoATER 2-FEEDER XXL CoATER
Width, approx. [m] 7.1 12
Length, approx. [m] 8.4 20
Height, approx. [m] 4.2 8.2
Weight, approx. [t] 33 90
Installed Power, [kVA] 500 1400
Cooling water, [m³/h] 75 125

No of floor levels
Single Dual

Typical Technical Parameters
SMART CoATER 2-FEEDER XXL CoATER
Total evaporation power installed:
1 EB-Gun 250 kW
2 EB-Guns, 500 kW total
Coating uniformity:
[min] < ± 10 % of the average deposited thickness for planar panels over the length of the coating area
Coating window:
[mm] 210 x 140 420 x 140
Substrate temperature/Coating:
[°C] max. 1,000 - 1,100
Substrate temperature/Preheating:
[°C] 550 to max. 1,200 adjustable

Ingot Capacity
[m] 2 m 20 m

Turbine Blade Coating
EB/PVD Production Systems

ALD Vacuum Technologies
High Tech is our Business

MetaCom / EB-PVD / 11.14
**Benefits of TBC**

- TBC absorb high thermal stress and enable higher turbine operating temperatures
  - Reduced fuel consumption
  - Higher efficiency
  - Longer turbine life-time
- TBC have a broad application range in
  - Aerospace
  - Power generating units

**Benefits of EB/PVD**

- EB/PVD produces superior coating quality thanks to
  - Homogeneous cloud of vapour responsible for
  - Controlled thickness distribution of layers with
  - Superior dendritic structure and
  - Firmly anchored roots and
  - Smooth surface properties
- EB/PVD is virtually exclusively approved in aerospace because of its unique structure

**The EB/PVD process is virtually exclusively approved in aerospace for high temperature turbine blades and vanes**

- The high performance electron beam evaporates metals as well as ceramics
  - Bond, diffusion and thermal barrier coatings
  - can be produced in a step by step process
  - With high deposition speeds
High Volume Production Systems

XXL Coater
Throughput of turbine blades up to 200,000 pcs/p.a. coated with YSZ*

*Yttria Stabilized Zirconia

The SL XXL Coater with 1 Feeder
The starting model into mass production with pilot size capacity
Large chamber volume and bigger gate valves enable
- Coating of bigger parts
- Handling of 4 axes in 1 feeder

The modular design allows further extensions
- e.g. retrofit to a 2-feeder coater is possible

The DL XXL Coater with 2 Feeders
Production system with two loading stations and medium size capacity
- Embedded are 40 years of experience and dozens of references
- Coating of blades and vanes

The DTL XXL Coater with 4 Feeders
The top model of the XXL product line
- The four feeders
- Enable continuous mass production of turbine components with
- High throughput and efficiency
The new SMART Coater – Proven components

Based on ALD’s approved standard and XXL concepts the new SMART Coater incorporates their proven components:

- highly reliable EB guns
- vapour cloud management
- controlled part movements
- sophisticated quality control

New features

- Short campaign times and small investment costs
- High part flexibility
- Small floor space requirements/no pit
- One man operation and service
- Small volumes

Further options

- 2 layer coating systems [2 crucibles]
- Multi layer coating systems [special crucible]
- Metal coatings
- Advanced layer monitoring by integration of a Residual Gas Analyzer in coating chamber
- Advanced quality management systems
EB/PVD Systems from ALD

ALD – Solution provider with market leading EB/PVD technology

- First EB/PVD system introduced already in the 1960’s
- Dozens of systems are installed in the field
- ALD offers a complete model range
  - From XXL Coater for mass production
  - Up to SMART Coater for repair/ R&D/ pilot production

Corporate features of ALD’s EB/PVD systems

1. High coating quality by fully reproducible control over vapour cloud and parts movements
   - Computer controlled scan of the electron beam over the molten pools (ECOSYS)
   - Optimal rotating and tilting of parts in the vapour deposition cloud

2. Heating with advanced graphite heater
   - Accurate pressure control during preheating

3. Shortest down time by fast evacuating/venting cycles
   - Rough pumping by mechanical pumps
   - Fine pumping by high performance diffusion pumps
   - Dynamic seal pumping

4. Sophisticated quality control
   - Identification, pre- and post- weighing of parts
   - Recipe handling and quality reporting
   - Integration into host computer environment

5. Proven electron beam gun design for high performance and reliability
   - Double pressure stage pumping
   - Pressure control at gun pressure stage
   - High beam power thanks to proprietary HV transformers
## Typical Technical Parameters

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You can find the addresses of all our sales partners and subsidiaries on www.ald-vt.com.