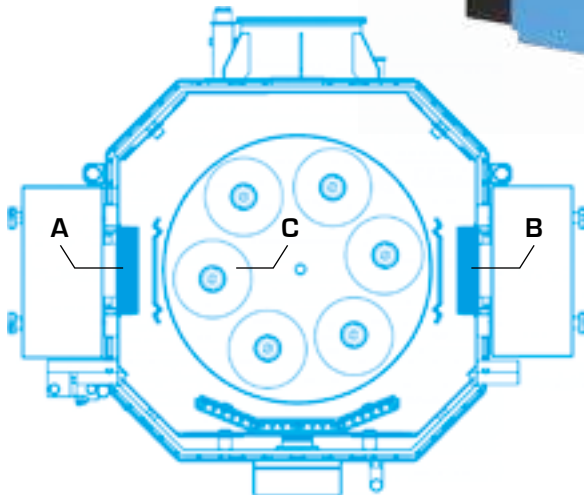


11

DLC SPUTTER Unit

711 DLC SPUTTER Unit

- A** Planar SPUTTER Cathode
- B** Planar SPUTTER Cathode
- C** Carousel



The PL711 is a compact SPUTTER coating unit based on HiPIMS technology (High Power Impulse Magnetron SPUTTERING). It's equipped with two Planar HiPIMS cathodes and allows for the deposition of selected nitride as well as carbon-based coatings (DLC2 and DLC3) using highly productive processes.

Technologies applied:

- 2 × Planar SPUTTER cathode with HiPIMS technology
- Dense plasma with a high ionization degree in the carousel generates homogeneous coatings and reaches a high deposition rate. Coatings from the PL711 provide outstandingly smooth surfaces with a high density, hardness and excellent adhesion.

PLATITE®



Targets
2



Signature Coatings



Cycle
≥ 8 - 9 h



Max. Load
250 kg



Solution
Turnkey



Service
Worldwide



711 DLC SPUTTER Unit

Specifications

Etching technologies applied:

- LGD® (Lateral Glow Discharge)
- Plasma etching with argon, glow discharge
- Metal ion etching (Ti, Cr)

Deposition types:

- SPUTTER nitride coatings
 - Reactive and non-reactive processes
 - Targets: Ti, Cr
 - Coating temperature at 400 °C or < 200 °C in the low-temperature version
- SPUTTER Cr and ta-C + a-C
 - DLC3
 - Targets: C, Cr
 - Coating temperature: < 150 °C
- SPUTTER Cr and PECVD a-C:H:Si
 - DLC2 (PECVD)
 - Targets: Cr
 - Coating temperature: 180 - 220 [°C]

Load and cycle times:

- Max. coating volume: \varnothing 540 × H 800 [mm]
- Max. coating height with defined coating thickness: 500 mm
- Max. load: 250 kg; higher weight upon request

2 batches / day for*:

| | | | | |
|-------------------------------|--------------------------------------|------|----------|---------|
| Shank tools (2 µm): | \varnothing 10 × 55 [mm] | CrN | 540 pcs. | 10–11 h |
| Molds and dies (3 µm): | up to \varnothing 160 × H 140 [mm] | CrN | 12 pcs. | 9–10 h |
| Sliding parts (3 µm): | 25 × 150 × 10 [mm] | DLC2 | 72 pcs. | 8–9 h |

* Average cycle times for a typical coating mix in a production environment.

Modular carousel systems:

- 1 or 3 or 6 axes

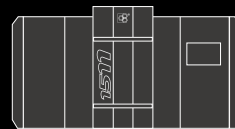
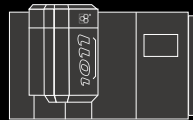
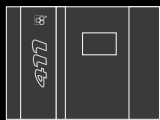
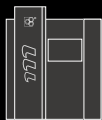
Software:

- Simple use and maintenance
- PLATIT SmartSoftware (PC and PLC system)
- Modern control system with touch screen
- Data recording and real-time display of process parameters and flow
- Manual and automatic process control
- Remote diagnostics and maintenance













Machine dimensions:

- Footprint: W 3450 × D 2250 × H 2350 [mm]

11-SERIES ACCESSORIES



Carousels

| | 111 | 411 | | |
|-----------------------------|--|--|---|---|
| Max. coatable height | 498 mm | 500 mm | | |
| |  <p>Single rotation D ≤ 355 mm</p> |  <p>Single rotation D ≤ 500 mm for saw blades, D ≤ 460 mm for molds & dies</p> |  <p>4 asymmetric axes D3 ≤ 183 mm, D1 ≤ 250 mm</p> |  <p>7 axes for triple rotation for gearboxes D ≤ 143 mm</p> |
| |  <p>4 axes for continuous triple rotation for gearboxes D ≤ 143 mm</p> |  <p>3 axes for saw blades with overlap D ≤ 285 mm</p> |  <p>4/8 axes D4 ≤ 215 mm / D8 ≤ 115 mm</p> |  <p>6/12 axes D6 ≤ 145 mm / D12 ≤ 100 mm</p> |
| |  <p>10 axes for continuous double rotation D ≤ 77 mm</p> |  <p>3/6 axes D3 ≤ 220 mm / D6 ≤ 150 mm</p> |  <p>5/10 axes D5 ≤ 175 mm / D10 ≤ 94 mm</p> |  <p>14 axes D ≤ 85 mm</p> |

Exemplary illustrations

711

800 mm



Double rotation
D ≤ 540 mm



3 axes for kicker
D ≤ 160 mm



6 axes for kicker or gearboxes
D ≤ 143 mm

1011 / 1511

805 mm



Single rotation
D ≤ 700 mm



2 axes for saw blades with overlap
D ≤ 450 mm



3 axes for saw blades
D ≤ 420 mm with overlap,
D ≤ 250 mm without overlap



4 axes for kicker
D ≤ 270 mm



4/8/12 axes for kicker
D ≤ 170 mm



10 axes for gearboxes
D ≤ 143 mm

Holders



Disc with gears



Gearbox with triple rotation



Quad gearbox for quad rotation

Loading capacities

Pi111

| Tool type | Tool diameter | Tool length | Satellites | Discs / satellite | Holders / disc | Tools / holder | Tools / disc | Tools / batch | Holder type |
|-------------------|---------------|-------------|------------|-------------------|----------------|----------------|--------------|---------------|-------------|
| Shank tool | 6 mm | 50 mm | 1 | 5 | 28 | 4 | 112 | 560 | E |
| | 6 mm | 50 mm | 1 | 5 | 52 | 1 | 52 | 260 | B |
| | 8 mm | 60 mm | 1 | 4 | 52 | 1 | 52 | 208 | B |
| | 10 mm | 70 mm | 1 | 4 | 52 | 1 | 52 | 208 | B |
| | 20 mm | 100 mm | 1 | 3 | 28 | 1 | 28 | 84 | B |
| Insert | 20 mm | 6 mm | 1 | 1 | 28 | 40 | 1120 | 1120 | C |
| Hob | 68 mm | 120 mm | 1 | 1 | 12 | 3 | 36 | 36 | F |
| | 80 mm | 120 mm | 1 | 1 | 6 | 3 | 18 | 18 | F |
| | 80 mm | 180 mm | 1 | 1 | 6 | 2 | 12 | 12 | F |

Pi411

| Tool type | Tool diameter | Tool length | Satellites | Discs / satellite | Holders / disc | Tools / holder | Tools / disc | Tools / batch | Holder type |
|-------------------|---------------|-------------|------------|-------------------|----------------|----------------|--------------|---------------|-------------|
| Shank tool | 6 mm | 50 mm | 7 | 4 | 5 | 9 | 45 | 1260 | G |
| | 6 mm | 50 mm | 7 | 5 | 8 | 4 | 32 | 1120 | D |
| | 6 mm | 50 mm | 7 | 5 | 18 | 1 | 18 | 630 | A |
| | 8 mm | 60 mm | 7 | 4 | 18 | 1 | 18 | 504 | A |
| | 10 mm | 70 mm | 7 | 4 | 18 | 1 | 18 | 504 | A |
| | 20 mm | 100 mm | 7 | 3 | 12 | 1 | 12 | 252 | A |
| Insert | 20 mm | 6 mm | 7 | 1 | 15 | 28 | 420 | 2940 | C |
| Hob | 80 mm | 120 mm | 14 | 3 | 1 | 1 | 1 | 42 | F |
| | 80 mm | 180 mm | 14 | 2 | 1 | 1 | 1 | 28 | F |

PL711

| Tool type | Tool diameter | Tool length | Satellites | Discs / satellite | Holders / disc | Tools / holder | Tools / disc | Tools / batch | Holder type |
|--------------------------------|---------------|-------------|------------|-------------------|----------------|----------------|--------------|---------------|-------------|
| Shank tool | 6 mm | 50 mm | 6 | 6 | 8 | 4 | 32 | 1152 | D |
| | 6 mm | 50 mm | 6 | 6 | 18 | 1 | 18 | 648 | A |
| | 8 mm | 60 mm | 6 | 6 | 18 | 1 | 18 | 648 | A |
| | 10 mm | 70 mm | 6 | 5 | 18 | 1 | 18 | 540 | A |
| | 20 mm | 100 mm | 6 | 4 | 12 | 1 | 12 | 288 | A |
| Insert | 20 mm | 6 mm | 6 | 1 | 15 | 22 | 330 | 1980 | C |
| Molds & dies | 160 mm | 140 mm | 3 | 4 | 1 | 1 | 1 | 12 | F |
| Sliding parts with DLC2 | 25 × 10 mm | 150 mm | 3 | 6 | 4 | 1 | 1 | 72 | F |

PL1011

| Tool type | Tool diameter | Tool length | Satellites | Discs / satellite | Holders / disc | Tools / holder | Tools / disc | Tools / batch | Holder type |
|-------------------|---------------|-------------|------------|-------------------|----------------|----------------|--------------|---------------|-------------|
| Shank tool | 6 mm | 50 mm | 4 | 8 | 23 | 4 | 92 | 2944 | E |
| | 6 mm | 50 mm | 4 | 8 | 42 | 1 | 18 | 1344 | B |
| | 8 mm | 60 mm | 4 | 7 | 42 | 1 | 42 | 1176 | B |
| | 10 mm | 70 mm | 4 | 6 | 42 | 1 | 42 | 1008 | B |
| | 20 mm | 100 mm | 4 | 4 | 36 | 1 | 36 | 576 | B |
| Insert | 20 mm | 6 mm | 4 | 2 | 36 | 30 | 1080 | 8640 | C |
| Hob | 80 mm | 120 mm | 12 | 6 | 1 | 1 | 1 | 72 | F |
| | 80 mm | 180 mm | 12 | 4 | 1 | 1 | 1 | 48 | F |

Pi1511

| Tool type | Tool diameter | Tool length | Satellites | Discs / satellite | Holders / disc | Tools / holder | Tools / disc | Tools / batch | Holder type |
|-------------------|---------------|-------------|------------|-------------------|----------------|----------------|--------------|---------------|-------------|
| Shank tool | 6 mm | 50 mm | 10 | 7 | 5 | 9 | 45 | 3150 | G |
| | 6 mm | 50 mm | 10 | 8 | 8 | 4 | 32 | 2560 | D |
| | 6 mm | 50 mm | 10 | 8 | 18 | 1 | 18 | 1440 | A |
| | 8 mm | 60 mm | 10 | 7 | 18 | 1 | 18 | 1260 | A |
| | 10 mm | 70 mm | 10 | 6 | 18 | 1 | 18 | 1080 | A |
| | 20 mm | 100 mm | 10 | 5 | 12 | 1 | 12 | 600 | A |
| Insert | 20 mm | 6 mm | 10 | 2 | 12 | 30 | 360 | 7200 | C |
| Hob | 80 mm | 120 mm | 12 | 6 | 1 | 1 | 1 | 72 | F |
| | 80 mm | 180 mm | 12 | 4 | 1 | 1 | 1 | 48 | F |

Holder type:

A Tool in a sleeve, driven by a gearbox

B Tool in a sleeve, driven by a kicker

C Insert with a hole, speared on a rod

D Tool in a revolver, driven by a gearbox

E Tool in a revolver, driven by a kicker

F Hob on a satellite / rod

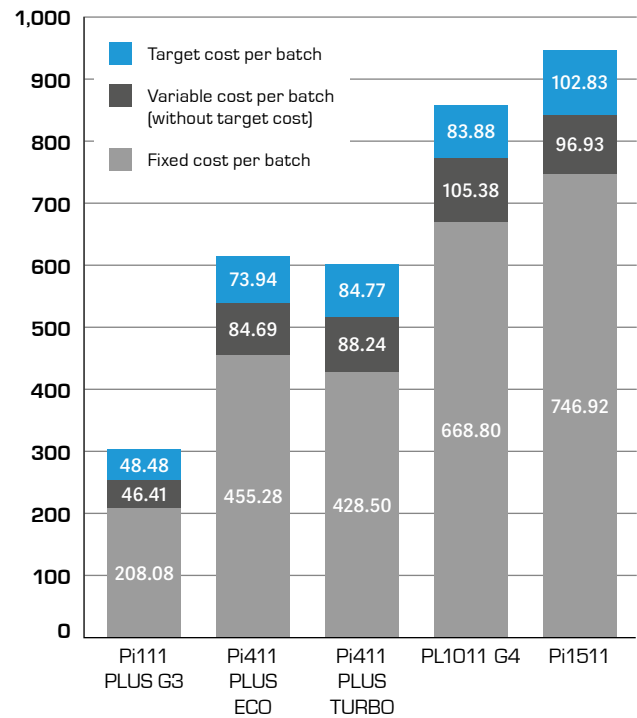
G Tool in a sleeve, driven by a quad gearbox

Process cost comparison

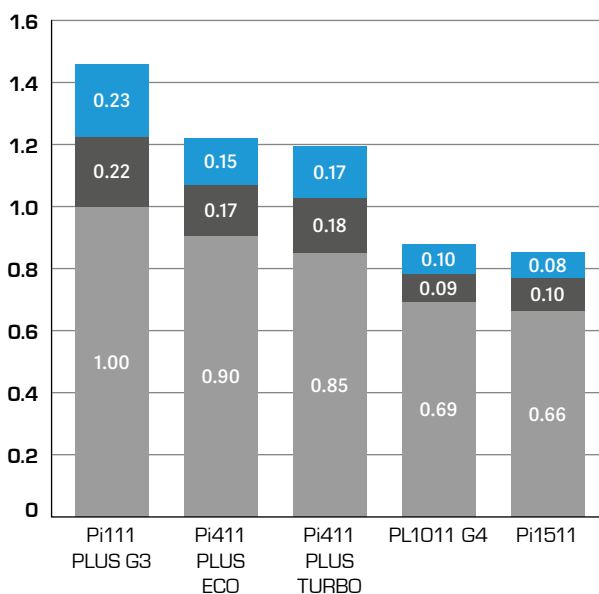
When calculating an investment in a PVD coating system, there are several variables to be taken into consideration. On this page we give you further insights about how fixed and variable costs add up for different PLATIT coating systems. We are using the case of a German SME coating 10 × 70 mm shank tools with three different coatings – AlTiN, AlCrN and TiXCo3.

The diagram on the right visualizes that the majority of the batch costs of a PVD system are determined by the fixed costs. The main cost drivers are personnel, depreciation, and rental costs. The variable costs, on the other hand, typically amount to less than a quarter of the total operating costs. In particular, the cost of the targets account for only 10–15% of the total cost per batch.

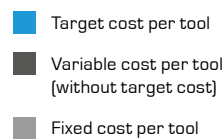
Cost per batch [CHF]:



Cost per tool [CHF]:



The diagram on the left visualizes the breakdown of cost per tool in different PLATIT coating systems. As it is shown in the diagram, the cost per tools decrease significantly in large-sized PVD coating units due to scale effects.



Detailed case description: German SME
 10 × 70 mm shank tools, AlTiN, AlCrN and TiXCo3 PVD coating
 Costs included:
 Investment costs for turnkey system including chiller, cleaning system and quality control devices, depreciated over 8 years
 Salaries, rental costs, energy (incl. gas, targets, water, and cleaning solution)

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COMPENDIUM

63

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