The Big Coating Unit of the Series

www.platit.com
PLATIT's entire product line consists of “compact” coating units. These units come in one piece, with the coating chamber in the same cabinet as the electronics. This eliminates the need of costly and time consuming on-site assembly.

MoDeC Innovations

PLATIT’s coating concept - Modular Dedicated Coating - allows the configuration of the number of cathodes, type, and position according to the coating task. MoDeC® is the driving force behind PLATIT innovations. New coatings and units are developed bearing this principle in mind.

MoDeC™ Innovations

PL 1011

- High volume compact unit
- The "workhorse" for coating centers
- 4 planar cathodes
- Conventional and selected TripleCoatings®
- Usable plasma volume: ø700x750 mm
- Coatable volume: ø700x700 mm
- Loading with ø10mm end mills: 1056 pieces
- 3 batches / day

π PLUS

2 LARC® + cathodes
LARC® technology: LAteral Rotating Cathodes
- The new generation of the first industrial coating unit for Nanocomposite coatings
- The heart of turnkey coating systems for small and medium enterprises
- Selected TripleCoatings®
- Coatable volume: ø355x460 mm
- Loading with ø10mm end mills: 288 pieces
- 5 batches / day
PLATIT's entire product line consists of "compact" coating units. These units come in one piece, with the coating chamber in the same cabinet as the electronics. This eliminates the need of costly and time consuming on-site assembly.

**11 Series**

MoDeC Innovations®

PLATIT's coating concept - Modular Dedicated Coating - allows the configuration of the number of cathodes, type, and position according to the coating task. MoDeC is the driving force behind PLATIT innovations. New coatings and units are developed bearing this principle in mind.

**TURBO 1111**

High performance compact coating unit

- **11 eco** is the basic machine
- **3 LARC® cathodes**
- Modular upgradeable with options:
  - DLC® option
  - 2 LARC® + cathodes
- **LARC® technology**: LAteral Rotating Cathodes
  - The new generation of the first industrial coating unit for Nanocomposite coatings
  - The heart of turnkey coating systems for small and medium enterprises

**411 PLUS**

- **OXI option**
- **SCIL® option**: high performance sputtering
- **3 LARC® cathodes + 1 central SCIL® cathode**
- **LACS® option**: Simultan LAteral ARCing + CEIntral sputtering
- For conventional and Nanocomposite coatings
- All **TripleCoatings® and QUAD Coatings®**
- Coatable volume: ø500 x 460 mm
- Loading with ø10mm end mills: 504 pieces
- 5 (up to 6) batches / day

**1115**

Combination of LARC® and planar ARC technologies

- **High volume compact unit**
- **3 newly developed LARC®-XL rotating cathodes in the door**
- **2 planar cathodes in the back as boosters**
- All 5 cathodes can deposit simultaneously
- For conventional and Nanocomposite coatings
- **Most TripleCoatings® and QUAD Coatings®**
- Usable plasma volume: ø700 x 750 mm
- Coatable volume: ø700 x 700 mm
- Loading with ø10mm end mills: 1056 pieces
- 3 batches / day
**General Information**

- High capacity hardcoating unit
- Based on PLATIT rotating (LARC®) and planar-cathodic-ARC-technology
- Coatings on HSS and WC (T \leq 500°C)

**Hard Coatings**

- Monolayers, Multilayers, and Nanolayers
- Nanocomposites, TripleCoatings® and QUADCoatings®
- Main Standard Coatings: AlCrN®, AlCrTiN®, TiXCo®

**Hardware**

- Foot print: W4882 x D2181 x H3354 mm
- Internal chamber size: W1000 x D1000 x H1100 mm
- Usable plasma volume: Ø700 x H750 mm
- Coatable volume: Ø700 x H700 mm
- Max. load: 400 kg
- BIAS: 20 kW, 350 kHz, 750 V
- Double wall, stainless steel, water cooled chamber
- Front door loading, excellent access
- 3 LARC®-XL rotating cathodes
- 2 PLATIT cathodes with quick-exchange system
- All 5 cathodes controlled by pulsed ARC supplies
- Electrical connection: 3x400 V, 50-60 Hz, 100 kVA
- Modular carousels with 2, 4, 8, 12 satellites

**Electronics and Software**

- Industrial PLC (programmable logic) system
- Industrial PC system
- Touch-screen operated
- Complete menu driven processes
- Easy diagnostic and help functionality
- Remote diagnostics
- No programming knowledge is required for process control
- Operator’s manual on CD-ROM

**Cycle Times**

<table>
<thead>
<tr>
<th>Tool Type</th>
<th>Diameter</th>
<th>Quantity</th>
<th>Cycle Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shank tools (2 µm)</td>
<td>ø10 x 70</td>
<td>1056 pcs</td>
<td>7.0 h</td>
</tr>
<tr>
<td>Inserts (3 µm)</td>
<td>ø20 x 6</td>
<td>6720 pcs</td>
<td>7.5 h</td>
</tr>
<tr>
<td>Hobs (4 µm)</td>
<td>ø80 x 180</td>
<td>48 pcs</td>
<td>8.0 h</td>
</tr>
</tbody>
</table>

*: The cycle times can be achieved under the following conditions:
- solid carbide tools (no outgassing necessary)
- high quality cleaning before the coating process (short etching)
- continuous operation (pre-heated chamber)
- 5-cathodes processes
- use of fast cooling (e.g. with helium, opening the chamber at 200°C)
- 3 batches / day
### Most Important Features

**High Capacity Coating Unit**
- 5 cathodes can run simultaneously
  - 3x LARC®-XL Lateral Rotating Cathodes
  - Main cathodes: Ti, Al, AlSi+, Cr, TiSi
- 2x planar ARC Cathodes
  - Main cathodes: AlCr, AlTi, Ti
- Deposition of TripleCoatings® and QuadCoatings®
- Up to 3 batches/day even with 3 different coatings

**High Loadability**
- Robust and easy change of loads

**Optimal Adhesion due to**
- VIRTUAL SHUTTER® and TUBE SHUTTER®
- LARC® GD®
- Planar shutters for the planar cathodes

**Combination of 2 PLATIT Technologies**
- 5: Planar cathode 2
  - default AlCr
- Planar shutter 2
- 4: Planar cathode 1
  - default AlCr
- Planar shutter 1
- 3: LARC®-XL cathode 3
  - default Cr
- 2: LARC®-XL cathode 2
  - default Al
- 1: LARC®-XL cathode 1
  - default Ti
- Heater
- Satellites
  - default 8
- Substrate carousel
- Planar shutters for the planar cathodes

### Main Application Fields
- Molds and dies with small and large dimensions (for forging, fine blanking, stamping, bending, etc.)
- Cutting tools especially with larger dimensions (saw blades, hobs, broaches)
- Job coating services

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**5: Planar cathode 2**
- default AlCr

**4: Planar cathode 1**
- default AlCr

**3: LARC®-XL cathode 3**
- default Cr

**2: LARC®-XL cathode 2**
- default Al
Most Important Application
Fields of the Forming tools for deep drawing, fine blanking, stamping, bending
Molds and dies
For job coaters with easy loading of mixed batches
Cutting tools with larger dimensions (saw blades, hobs, broaches)
Forming tools for deep drawing, fine blanking, stamping, bending
Cathode towers
3+1 tower  4+4 tower

Taking out the rotating cathode from the wooden box by the lift FL380 for cathode exchange

FL380 fork lift with cathode

Single rotation carousel with mold and dies

Single rotation carousel with saw blades - Dmax=700 mm

2 axis carousel for saw blades with overlapping Dmax=450 mm

4 axis carousel with molds and dies - Dmax=300 mm

8 axis carousel with shank tools - D-gearbox=172 mm

12 axis carousel with hobs Dmax=110 mm

Carousels and Handling Devices
Main Coatings of the \( \pi^{1511} \)

- AITiCrN³
- AITiN³
- AlCrN³
- CrTiN³
- TiN
- ALL³: AlTiCrN³
- ALL⁴
- ALL⁴
Main Coatings of the

®

3

AlCrN

ALL

®

4

®

AlTiCrN

nACoX

®

4

nACo

®

3

AlTiN

CrTiN

TiN

®

4

®

nACRo

®

4

nACo

®

4

®

AlCrTiN

®

TiXCo

®

4

®

4

ALL

®
Basic Coatings of the \( \pi^{1517} \)

**TripleCoatings\(^3\)**

<table>
<thead>
<tr>
<th><strong>CrTiN(^3)</strong>: For Forming</th>
</tr>
</thead>
<tbody>
<tr>
<td>CrTiN - Cr/TiN-NL - CrN or TiN</td>
</tr>
<tr>
<td>( \pi^{1517} ) : 1: Ti – 2: Al – 3: Cr – 4: Ti/Cr – 5: Ti/Cr</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>AlTiN(^3)</strong>: For Universal Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>TiN - AlTiN-G - AlTiN-NL</td>
</tr>
<tr>
<td>( \pi^{1517} ) : 1: Ti – 2: Al – 3: Cr – 4: AlTi(<em>{33}) – 5: AlTi(</em>{33})</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>AlCrN(^3)</strong>: For Dry Cutting Abrasive Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>CrN - Al/CrN-NL - AlCrN</td>
</tr>
<tr>
<td>( \pi^{1517} ) : 1: Ti – 2: Al – 3: Cr – 4: AlCr(<em>{30}) – 5: AlCr(</em>{30})</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>ALL(^3): AlTiCrN(^3)</strong>: Universal for Cutting and Forming</th>
</tr>
</thead>
<tbody>
<tr>
<td>CrTiN - Al/CrN Multilayer - AlTiCrN - (CrCN optional)</td>
</tr>
<tr>
<td>( \pi^{1517} ) : 1: Ti – 2: Al – 3: Cr – 4: AlCr(<em>{30}) – 5: AlCr(</em>{30})</td>
</tr>
</tbody>
</table>

What are **TripleCoatings\(^3\)**?

TripleCoatings\(^3\) aim at combining these 3 features:
- optimal adhesion layer (e.g. TiN, CrN)
- tough core layer (e.g. multi- or nanolayer coatings)
- hard wear resistant toplayer (e.g. Nanocomposites)

What are **QuadCoatings\(^4\)**?

Aim of QuadCoatings\(^4\):
- Integration of a 4th feature in addition to TripleCoatings\(^3\) e.g.
  - 4th coating block
  - extreme heat isolation with AlON
  - lubrication with CrCN
ALL®: AlCrTiN®: For Wet and Dry Machining
CrTiN - AlCrTiN-G - Al/CrN Multilayer - AlCrTiN - (CrCN optional)

nACo®: For Universal Use, Turning, Drilling
TiN - AlTiN-G - AlTiN-NL - nACo

nACRo®: For Superalloys, Milling, Hobbing
CrN - AlCrN-G - AlCrN-NL - nACRo

TiXCo®: For Superhard Machining
TiN - nACo-G - nATCrO-ML - TiSiN

nACoX®: For HSC Dry Turning and Milling
TiN - AlTiN - nACo - AlCrON
## Coating Guide

### Coating Usage Recommendations

<table>
<thead>
<tr>
<th>Coating Usage Recommendations</th>
<th>Cutting</th>
<th>Chipless Forming</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turning</td>
<td>Milling - Hobbing Gear Cutting Sawing</td>
<td>Tapping</td>
</tr>
<tr>
<td>Steels unalloyed &lt; 1000 N/mm²</td>
<td>- nACo®, nACo®, AIIN</td>
<td>- nACo®, nACo®, AIIN</td>
</tr>
<tr>
<td>Steels unalloyed &gt; 1000 N/mm²</td>
<td>- nACo®, nACo®, AIIN</td>
<td>- nACo®, nACo®, AIIN</td>
</tr>
<tr>
<td>Steels hardened &lt; 55 HRC</td>
<td>- nACo®, nACo®, AIIN</td>
<td>- nACo®, nACo®, AIIN</td>
</tr>
<tr>
<td>Steels hardened &gt; 55 HRC</td>
<td>- nACo®, nACo®, AIIN</td>
<td>- nACo®, nACo®, AIIN</td>
</tr>
<tr>
<td>Stainless steel</td>
<td>- nACo®, nACoX, nACoX, nACoX</td>
<td>- nACo®, nACoX, nACoX, nACoX</td>
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<tr>
<td>Superalloys Ni-based</td>
<td>- nACoX, nACoX, nACoX, nACoX</td>
<td>- nACoX, nACoX, nACoX, nACoX</td>
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<tr>
<td>Superalloys Ti-based</td>
<td>- nACoX, nACoX, nACoX, nACoX</td>
<td>- nACoX, nACoX, nACoX, nACoX</td>
</tr>
<tr>
<td>Cast iron</td>
<td>- nACoX, nACoX, nACoX, nACoX</td>
<td>- nACoX, nACoX, nACoX, nACoX</td>
</tr>
<tr>
<td>Aluminum Si &gt; 12%</td>
<td>- nACoRo®, nACoRo®, nACoRoX, nACoRoX</td>
<td>- nACoRo®, nACoRo®, nACoRoX, nACoRoX</td>
</tr>
<tr>
<td>Aluminum Si &lt; 12%</td>
<td>- TiB, TiB, ZrN, ZrN</td>
<td>- TiB, TiB, ZrN, ZrN</td>
</tr>
<tr>
<td>Copper</td>
<td>- CROMVic³, CrN</td>
<td>- CROMVic³, CrN, CROMVic³, CrN</td>
</tr>
<tr>
<td>Bronze, Brass, Plastic</td>
<td>- TiCN, CROMTIVic⁵</td>
<td>- TiCN, CROMTIVic⁵, CROMTIVic⁵</td>
</tr>
<tr>
<td>Graphite</td>
<td>- CROMVic³, CROMVic³, CROMVic³, CROMVic³, CROMVic³, CROMVic³, CROMVic³</td>
<td>- CROMVic³, CROMVic³, CROMVic³, CROMVic³, CROMVic³, CROMVic³, CROMVic³, CROMVic³</td>
</tr>
<tr>
<td>Carbon-fibre composites</td>
<td>- CROMVic³, CROMVic³, CROMVic³, CROMVic³, CROMVic³, CROMVic³, CROMVic³</td>
<td>- CROMVic³, CROMVic³, CROMVic³, CROMVic³, CROMVic³, CROMVic³, CROMVic³, CROMVic³</td>
</tr>
<tr>
<td>Wood</td>
<td>- CROMTIVic⁵, nACoVic², nACoVic², nACoVic², nACoVic², nACoVic², nACoVic²</td>
<td>- CROMTIVic⁵, nACoVic², nACoVic², nACoVic², nACoVic², nACoVic², nACoVic², nACoVic²</td>
</tr>
</tbody>
</table>

**Primary Recommendation:**
- If available, use this coating for the application.

**Alternate Recommendation:**
- Use this coating when the primary recommendation is not available.

- Thickness and structure can and should be different according to the different application processes even for the same coating.
- The exponent \( x \) (coating) is defined by the machine, which coating generation the machine can deposit.