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

- **π 311 eco**
  - 3 LARC™ cathodes
  - Medium size compact coating unit for economical start
  - For conventional and Nanocomposite coatings
  - Selected TripleCoatings™
  - Selected QUADCoatings™
  - Coatable volume: ø485x440 mm

- **π 211**
  - 2 LARC™ cathodes
  - LARC™ technology with πsCoAT™
    - Dedicated unit for DLC™ (ta-C) coatings
    - πsCoAT: π smooth Coating with straight forward ARC filtering
    - Coatable volume: ø355x460 mm

- **π 111**
  - 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 SMEs
    - Selected TripleCoatings™
    - Coatable volume: ø355x460 mm

- **π 311**
  - 3 LARC™ cathodes + 1 CERC™ cathode
  - Medium size compact coating unit
  - 3 cathodes deposit simultaneously
  - For conventional and Nanocomposite coatings
  - All TripleCoatings™
  - All QUADCoatings™
  - Coatable volume: ø485x440 mm

- **π 411**
  - 3 LARC™ cathodes + 1 CERC™ cathode
  - High performance compact coating unit
  - All 4 cathodes can deposit simultaneously
  - CEntral Rotating Cathode as productivity booster
  - For conventional and Nanocomposite coatings
  - All TripleCoatings™ and QUADCoatings™
  - Coatable volume: ø500x460 mm

- **π 1511**
  - 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
    - Central Rotating Cathode as productivity booster
    - For conventional and Nanocomposite coatings
    - Most TripleCoatings™ and QUADCoatings™
    - Usable plasma volume: ø700 x 750 mm
    - Coatable volume: ø700 x 700 mm

- **π 311**
  - 3 LARC™ cathodes
  - Medium size compact coating unit
  - 3 cathodes deposit simultaneously
  - For conventional and Nanocomposite coatings
  - All TripleCoatings™
  - Coatable volume: ø485x440 mm

Patented in 2003
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.

\[\pi^{3\text{LARC}}\text{eco}\]

3 LARC® cathodes
- Medium size compact coating unit for economical start
- For conventional and Nanocomposite coatings
- Selected TripleCoatings³®
- Selected QUADCoatings⁴®
- Coatable volume: ø485x440 mm

\[\pi^{2\text{LARC}}\text{coating}\]

2 LARC® cathodes
LARC® technology with πsCOAT®
- Dedicated unit for DLC² (ta-C) coatings
- πsCOAT: π smooth Coating with straight forward ARC filtering
- Coatable volume: ø355x460 mm

\[\pi^{\text{π3LARC}}\text{coating}\]

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 SMEs
- Selected TripleCoatings³®
- Coatable volume: ø355x460 mm
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.

**π311**

3 LARC® cathodes + 1 CERC® cathode
- Medium size compact coating unit
- 3 cathodes deposit simultaneously
- For conventional and Nanocomposite coatings
- All TripleCoatings³®
- Selected QUADCoatings®
- Coatable volume: ø485x440 mm

**π411**

3 LARC® cathodes + 1 CERC® cathode
- High performance compact coating unit
- All 4 cathodes can deposit simultaneously
- CEntral Rotating Cathode as productivity booster
- For conventional and Nanocomposite coatings
- All TripleCoatings³® and QUADCoatings®
- Coatable volume: ø500x460 mm

**π1511**

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 TripleCoatings³® and QUADCoatings®
- Usable plasma volume: ø700 x 750 mm
- Coatable volume: ø700 x 700 mm
**General Information**
- High capacity hardcoating unit
- Based on PLATIT rotating (LARC®) and planar-cathodic-ARC-technology
- Coatings on HSS and WC (T ≤ 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***
- Shank tools (2 µm): ø10 x 70 mm, 1056 pcs: 7.0 h
- Inserts (3 µm): ø20 x 6 mm, 6720 pcs: 7.5 h
- Hobs (4 µm): ø80 x 180 mm, 48 pcs: 8.0 h

*: 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)
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**

**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
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

Forming tools for deep drawing, fine blanking, stamping, bending

Cutting tools with larger dimensions (saw blades, hobs, broaches)
Carousels and Handling Devices

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
**Basic Coatings of the**

### CrTiN®: For Universal Use, Molds and Dies

CrTiN - Cr/Ti-ML - CrN/TiN (according to needed color)

TiN, CrN, TiCN - grey are also available

### AlTiN®: For Universal Use

TiN - AlTiN-G - AlTiN-NL

### nACo®: For Universal Use, Drilling, Turning

TiN - AlTiN-NL - nACo

### AlCrN®: For Abrasive Materials, Sawing, Fine Blanking

CrN - AlCrN-G - AlCrN-NL

### What are TripleCoatings®?

TripleCoatings® 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)
**ALL\textsuperscript{4®}**: AlCrTiN\textsuperscript{4®} for Universal Use, Forming, Hobbing

CrN - CrTiN - AlCrN-NL - AlCrTiN-NL - CrCN (optional)

The option CrCN should be used according to prevailing lubrication conditions.

**nACRo\textsuperscript{4®}**: For Abrasive Materials, for HSC

CrN - AlCrN-G - AlCrN-NL - nACRo

**TiXCo\textsuperscript{4®}**: For Hard Machining

TiN - AlTiN - nACo-ML - TiSiN

**AlCrTiN-ML\textsuperscript{4®}**: Dedicated Coating for Forging Dies

TiN - AlTiCrN-G - (TiN - CrN - AlCrN)\textsuperscript{\textsuperscript{3®}}

**What are QUAD Coatings\textsuperscript{4®}?**

Aim of QuadCoatings\textsuperscript{4®}:
- Integration of a 4th feature in addition to TripleCoatings\textsuperscript{3®}, e.g.
- 4\textsuperscript{th} coating block
- extreme heat isolation with AlON
- lubrication with CrCN
Coating Generations and their Structures

1. Generation

Monoblock Structure Without Adhesion Layer

The monoblock structure without adhesion layer can be produced by the fastest, most economical process. All targets are the same and run during the whole deposition process.

2. Generation

Conventional Structures With Adhesion Layer

- Monoblock
- Gradient (G)
- Multilayer (ML) Period > 20 nm
- Nanolayer (NL) Period < 20 nm
- Nanocomposite (NC)

3. Generation: TripleCoatings®

- Nanocomposite top layer
- Monoblock or gradient core layer
- Adhesion layer

4. Generation: QUAD Coatings®

- Nanocomposite top layer
- Multilayer core layer
- Gradient core layer
- Adhesion layer

- Especially at high aluminum content the monoblock coating should be started with adhesion layer (e.g. TiN or CrN).
- At gradient structure the ratio of hard components (e.g. cubic AlN) will be continuously increased obtaining the highest hardness on the top of the coating.
- Multilayer structures have higher toughness at lower hardness than comparable monoblock coatings. The "sandwich" structure absorbs the cracks by the sublayers.
- Nanolayer is the conventional structure for the so called Nanocoatings. It is a finer version of multilayers with a period of < 20 nm.
- At depositing Nanocomposites the hard nanocrystalline grains (TiAlN or AlCrN) become embedded in an amorphous SiN-Matrix.
The "parent" coatings determine the application fields of all "children" coatings in the same row. The "children" coatings specify PLATIT's standard coatings, which can be deposited by the machine of the columns. The exponent x (coating) describes the generation of the coating.

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