

**SULZER**

Sulzer Metco

## **METAPLAS-DOMINO**

The new Metaplas PVD system concept





## DOMINO fascination

The fascination of the game of dominos is found in the vast diversity of ways the individual tiles can be positioned against one another. The arrays of dominos can, in principle, be extended in all directions, without limitation, depending on the number of pips. The winner is the player who plans his or her moves most cleverly and uses his or her dominos best. The rules of the game of dominos may vary, just as the rules of the market can change: tool service-lives must be increased, cost per piece, on the other hand, reduced. Only those who know the rules and plan their strategy carefully can win. Therefore an innovative surface technology is necessary that provides diverse potentials for layer architectures and their properties and enhances productivity simultaneously.



The new **METAPLAS-DOMINO** system

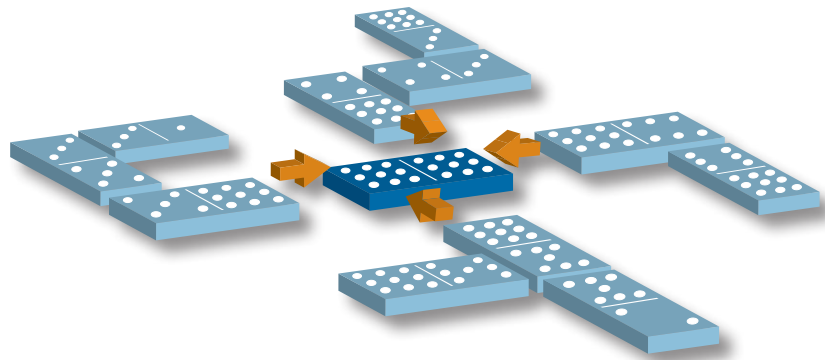
Just as matching dominos are arranged alongside one another in the game of dominos, the **METAPLAS-DOMINO** system enables the variable assembly of a number of modules to form a large whole that meets individual needs and requirements. The **METAPLAS-DOMINO** is a powerful and reliable system that provides new coating potentials and at the same time focuses firmly on coating costs. The system's modular and flexible concept also allows subsequent expansion and/or upgrading without difficulty.

Invest in the future:

**METAPLAS-DOMINO** combines maximum productivity with a diverse range of individual configuration potentials while simultaneously reducing cost per piece.

## One technology-platform – infinite possibilities

**METAPLAS-DOMINO** stands for flexibility. The central element is the base-platform, which can be adapted to meet your individual needs simply by adding modules and/or by means of upgrades.



### Chamber Module S

Octagonal chamber 722 mm x 722 mm x h 950 mm, Capacity 470 liter, usable volume dia. 400 x 500 mm

### Chamber Module L

Octagonal chamber 876 mm x 876 mm x h 1100 mm, Capacity 750 liter, usable volume dia. 570 x 700 mm

### APA triple

Triple evaporator array, target area dia. 100 mm each, 3 x 150 A power supply, pivot trigger

### APA quattro

Quadruple evaporator array, target area dia. 100 mm each, 4 x 150 A power supply, pivot trigger

### Sputter 700

700 mm sputter source, DC power supply individual shutter, individual gas feed

### Sputter 900

900 mm sputter source, DC power supply individual shutter, individual gas feed

### Pulse Sputter 700

700 mm pulse-sputter source, bipolar-pulsed power supply, individual shutter, individual gas feed

### Pulse Sputter 900

900 mm pulse-sputter source, bipolar-pulsed power supply, individual shutter, individual gas feed

### Bias A

Bipolar pulsed, 100 Hz to 20 kHz, 30 A, 1000 V

### Bias B

Bipolar pulsed, 100 Hz to 20 kHz, 60 A, 1000 V

### Bias C

Medium frequency MF, 5 Hz to 350 kHz, 650 V, 30 A

### Oxi-Module

System configuration for processes using reactive gas such as oxygen for deposition of oxides and oxynitrides

### CH-Module

System configuration for processes using burnable gases such as acetylene for deposition of carbon-containing layers

The modules mentioned above are only representative examples of the available range.

## METAPLAS-DOMINO benefits at a glance:

### 1 Modular platform to meet individual needs with initial configuration and subsequent updates

- APA Arc technology
- Sputter technology
- Hybrid technology
- Pulse technology

### 2 High-performance system for maximum productivity and low cost per piece

- Optimum configuration of coating volumes
- Up to 80% reduction in consumption costs compared to currently available evaporators
- AEGD technology, patented and highly efficient plasma cleaning for excellent layer adhesion
- Homogeneous layer characteristics throughout the batch
- Modern vacuum technology
- Reduced cycle times

### 3 Innovative APA evaporator technology

- Double deposition rate under production conditions compared to currently available evaporators
- Enhanced target utilization
- Adjustable magnetic fields
- New pivot triggers
- High plasma density
- Smooth layers thanks to reduction of macroparticles
- Range of diverse potentials for new layer architectures (morphology, stoichiometry, doping, multilayer, nanolayer)
- Short target changing times
- Individual shutter

### 4 Smart solutions for both present and future tasks

- More cost-efficient production of established layer systems, such as TiN, TiCN, AlTiN, CrN, W:C-H, etc.
- Deposition of new layer systems, such as "micro-alloyed-coatings"
- Ready prepared for all future needs and applications



## Cost-efficiency and high-performance!

**METAPLAS-DOMINO** is the name for strategic problem-solving capability, maximum performance, productivity-enhancement concepts and the resultant added value.

Parallel to the development of **METAPLAS-DOMINO**, development of new coatings for more cost-effective high-performance production has been accelerated and a new and catchy naming assigned. The future coating designations provide an indication of the applications for the individual coatings, making the coatings an integral element in the performance package.

Our coatings are in use successfully wherever maximum modern production demands are needed – including high-performance machining of tool steels, modern cast materials and high-temperature alloys. And these coatings solve forming, shaping and tribological problems with equal ease.

Not only enhancement of the service-lives of coated tools, but also performance potential plays an important role. Precisely here is where our high-performance coating technology proves its capabilities. The **METAPLAS-Machining** series of innovative coatings for chip-removing machining produced by **METAPLAS-DOMINO** is based on the new “micro-alloyed-coating” layer technology and is the result of consistent development, refinement and optimization of methods and processes.

Application code

**M***tec*

**M***power*

Coating type

## All-round coating for maximum demands

**M<sub>tec</sub>** is one of the innovative **METAPLAS-Machining** series of coatings. It stands out for its improved performance characteristics for high-performance cutting (HPC). **M<sub>tec</sub>**'s optimized and extremely closed morphology makes it particularly suitable for machining of otherwise poorly machinable materials. The structure of the coating layer can be adjusted, with the same target composition, within a broad parameter field ranging from fine columnar to nanocrystalline, and can thus be optimally matched to requirements. The APA (Advanced Plasma-Assisted) evaporator technology of **METAPLAS-DOMINO** achieves extremely high ionization of the vaporized material and a high plasma density. The **METAPLAS-Machining** series layers therefore exhibit, in addition to other important characteristics, high hardness, high thermal stability and high resistance to oxidation. **M<sub>tec</sub>** also offers ideal bond-layer properties.

**M<sub>tec</sub>** is suitable, in particular, for use in chip-removing machining of:

- Heat-treated steels
- Austenitic steels
- The most diverse range of high-temperature alloys, titanium,  $\gamma$ -TiAl- and nickel-based alloys

### Properties of M<sub>tec</sub>-coating

- 1 Microhardness:**  
3000  $\pm$ 300 HV
- 2 Characteristic layer thickness:**  
2 to 10  $\mu$ m
- 3 Maximum working temperature:**  
up to 900 °C
- 4 Layer structure:**  
fine columnar to nanocrystalline
- 5 Colour:**  
Anthracite



M<sub>tec</sub> coated tools

As generally applies in innovative chip-removing machining, microgeometry and selection of the most suitable base material, the most appropriate grinding process and pre- and after-treatment methods matched to the application, tool and material, are essential for successful use of a coated high-performance tool. Tool edge roundness, tool edge roughness and tool edge preparation prior to and after coating play a decisive role in the machining of V2A materials and chip-removing machining from the solid of compressor and turbine components.

**M<sub>tec</sub>** provides ideal protection of HSS and solid carbide tools, and also carbide indexable inserts, against wear. Thanks to **M<sub>tec</sub>**'s interfacial properties, and its surface chemistry, in particular, the tendency to sticking to the work material is extremely low. **M<sub>tec</sub>** can also be applied to protect and raise the performance potential of ceramic materials. The IP-protected AEGD process (Arc Enhanced Glow Discharge) imparts to the **M<sub>tec</sub>** layer extremely good adhesion to all widely used tool materials. The residual compressive stress of the layer is matched to the application by means of careful process design, parameter set-up and layer architecture, to ensure the optimum solution.

## Allways in a good shape with the “micro-alloyed-coating” technology

**Mpower** is the first in the “micro-alloyed-coatings” series. Top-class performance features in high-performance (HPC) and high-speed cutting (HSC) make **Mpower** the first-choice coating for mould-making, particularly where service conditions are more difficult. This is due not only to the high steel hardness – in the 60 HRC range or more – but rather to the situation in which tool and plastic-mould steels of moderate hardness but high carbide content need to be machined with high precision and with a practically polished surface after finish-machining. Carbide type, carbide volume, carbide hardness and carbide size are important factors in this context.

**Mpower** is especially suitable for HPC and HSC machining of:

- Cold work tool steels with variable carbide contents and around 57 to 63 HRC,
- Hot work tool steels of around 40 to 54 HRC and corresponding hot strength,
- Steels developed specially for plastics extrusion and injection-moulding moulds with elevated resistance to corrosion, good polishability and 45 to 58 HRC

### Properties of **Mpower**-coating

- 1 Microhardness:**  
3550 ±350 HV
- 2 Characteristic layer thickness:**  
2 to 7 µm
- 3 Maximum working temperature:**  
up to 1150 °C
- 4 Layer structure:**  
fine columnar to nanocrystalline,  
nano/multilayer
- 5 Colour:**  
Copper



**Mpower** coated tools

Thanks to its microstructure, which is matched to the particular application, and to its phase stability up to elevated temperatures as high as 1150°C, **Mpower** meets innovative users’ and mould-makers’ demands for increased performance and productivity. Ultra-small adjustments to match the material to be machined produce significant performance gains, particularly in superfinishing. **Mpower** provides the best harmonized solution in the context of rapid material development for mould-making.

The IP-protected AEGD process (Arc Enhanced Glow Discharge) imparts to the **Mpower** layer extremely good adhesion on all widely used tool materials. The residual compressive stress of the layer is matched to the application by means of careful process design, parameter set-up and layer architecture, to ensure an optimum solution. Similarly, **METAPLAS-DOMINO** process technology also makes it possible to protect ceramic materials against wear using **Mpower**, and to simultaneously raise their performance potential. Thanks to a microgeometry optimally matched to the machining task, **Mpower** coated tools show a performance characteristic which stands out for low sticking tendency and high resistance to wear in the machining of hard and high-carbide steels and difficult-to-machine alloyed materials.

## Your new modular PVD system

### Your contact data

Company

Contact

Phone

E-Mail

### Intended applications, dimensions, production numbers

### Other applications conceivable in the near future

### Surface technologies/equipment used up to now

### Other relevant information

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