

OPTICS

# SYRUS pro

FAMILY

The flexible and  
productive coating  
system family  
in precision optics



LEYBOLD OPTICS

## Meeting individual requirements

The name of LEYBOLD OPTICS is renowned all over the world for well thought-out solutions for the coating industry. Our philosophy: manufacturing coating systems that do not only excel in their absolute process stability and the perfect results they produce, but also in low costs of ownership. Our systems always meet the highest demands on handling while requiring only the least possible amount of maintenance work. But LEYBOLD OPTICS stands for even more: unique systems with tailor-made manufacturing processes.

The division Optics specializes in manufacturing high vacuum coating systems for precision optics and ophthalmic applications. It also provides customized processes for applications ranging from UV to VIS up to IR spectral range. Various filter coatings, such as color filters, UV-IR-cut filters, narrow-band pass filters, laser coatings, and cold light mirror coatings are just a part of the process portfolio which can be performed by the SYRUS*pro* coating systems.

The department of research und development is responsible for the constant technological lead of our company. Its technologies make LEYBOLD OPTICS one of the top producers in the worldwide market. Adhering to the 150-year-old tradition of our company, we give priority to research: in the pioneer spirit of our founders, Ernst Leybold from Cologne and Wilhelm Karl Heraeus from Hanau, we aim at finding new manufacturing processes in the field of vacuum technology.



Meeting the highest demands: LEYBOLD OPTICS always gives priority to research.



## Performance and productivity

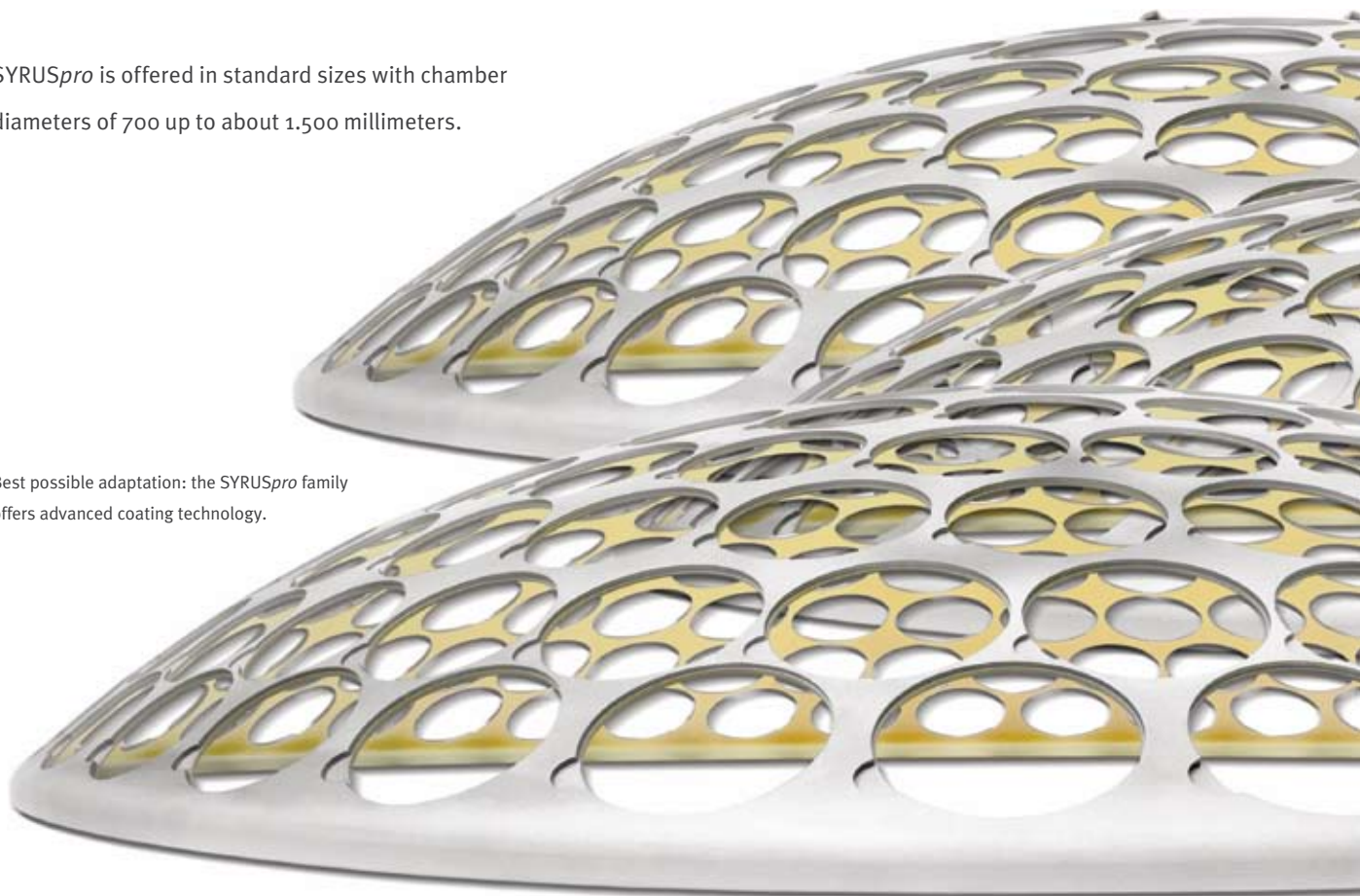
Our SYRUS*pro* family always offers the right choice of coating systems for any requirements in the field of precision optics. They are equipped with a new type of process control system, which excels by high flexibility combined with a maximum of automation, and a wide selection of hardware components, which guarantee for the best possible adaptation of the systems to the individual needs of our customers. Optical and/or physical monitoring is used to control the precision of layer thickness, which results in precise layer growth, high uniformity over the entire coated area, and a superlatively high production yield. All SYRUS*pro* models are easily integrated into the customers' in-house networks, because they operate on the basis of standard Ethernet network technology and the Windows platform. Their user-friendly operator interface serves to control and monitor all components of these coating systems.

SYRUS*pro* is offered in standard sizes with chamber diameters of 700 up to about 1.500 millimeters.

Best possible adaptation: the SYRUS*pro* family offers advanced coating technology.

All systems can be used in a clean-room. Their advanced technology allows for coatings up to the cutting edge, which provides a competitive advantage for a wide range of applications, from large scale to special.

In developing this family of coating systems the focus of our attention was on performance and productivity. True to the business philosophy of our house, we have consistently implemented these two basic concepts in our SYRUS*pro*. Consequently, excellent quality and high yield results, which the good name of LEYBOLD OPTICS stands for, are produced at the lowest possible costs.



## Sophisticated solutions for highest demands

### **SYRUSpro 1500**

SYRUSpro 1500, the largest of the standard-sized systems, produces optical coatings of ultimate precision at a high rate of productivity. It offers APSpro technology and optical monitoring by our OMS system. Special features are a fully automated programming structure for automatic processes and the modular system configuration. A short pumping time and a high deposition rate help to reduce production costs. SYRUSpro 1500 and all the component parts we can offer are purpose-built for 24-hour-a-day mass production and also suitable for clean room use.

### **SYRUSpro 1100**

Meeting individual requirements, SYRUSpro 1100 offers an optimum of production capacity, thin film performance and process flexibility. And of course, APS technology and optical monitoring by our OMS system are available for this standard optical coating system with a chamber diameter of 1100 millimeters.

### **SYRUSpro 900**

SYRUSpro 900, a medium-sized system for the production of optical coatings with a chamber diameter of 900 millimeters, represents the flexible concept realized in the SYRUSpro family. Here, production capacity, optimum thin film performance and high process repeatability are combined to achieve the very best coating results. Although SYRUSpro 900 takes up just about 16 square meters of valuable space on the production floor, it can meet any specific requirements. Like the larger 1100 system, SYRUSpro 900 works with optical thickness monitoring (OMS), and physical monitoring by quartz crystal thickness monitoring is another possible option.



SYRUSpro 1100, the versatile tool for customized production



SYRUSpro 1500, the workhorse for mass production and high performance

## **SYRUSpro 700**

SYRUSpro 700, the smallest member of the family, is a very compact and cost-effective solution. Despite being designed for small batch production, this model offers all the advantages of the large systems. OMS 5000 as well as APS, or the specific SYproCS control system, are all available for it. This does not only make it a good choice for mass production, but also for testing prototypes or for process development in a pre-production environment. SYRUSpro 700 needs no more than 11 square meters of floor space, including its safety and operation areas.

## **SYRUSpro DUV**

SYRUSpro DUV is a custom-made coating system for DUV applications, optimized for coatings at 193 nm. In order to prevent contaminations by hydrocarbons, the vacuum chamber is specially prepared. The materials of the components installed are selected to

prevent contamination during operation. Partly metal sealing and special feed-throughs, completed by a cryo pumping system and a dry rough vacuum pumping stage, are employed to achieve the optimum results.

## **SYRUSpro CFM**

SYRUSpro CFM has been specifically designed for digital optical uses, such as UV/IR-cut and color filter applications. Its special features are an increased loading capacity, a high-speed process and a superior production output, which make it the ideal solution for cost-effective mass production of consumer products. Based on the standards of the system family and making use of components that have long proved to be dependable, SYRUSpro CFM provides increased production capacity while decreasing downtime and achieving a superior layer performance. And the APSpro technology ensures shift-free and excellent filter properties with high transmission and low losses.

Solutions by LEYBOLD OPTICS  
increase production while  
decreasing downtime.



## Excellent coating results

The SYRUS*pro* family is designed to meet any production scale requirement ranging from large scale mass production (1500 series) to standard (1100 series), and medium size (900 series) to pilot and small scale production (700 series). The APS*pro* technology helps to achieve high productivity, while our OMS optical monitoring ensures high accuracy and tight coating specifications.

Thanks to the fully automatic operation of SYRUS*pro*, the management of all components and the coating

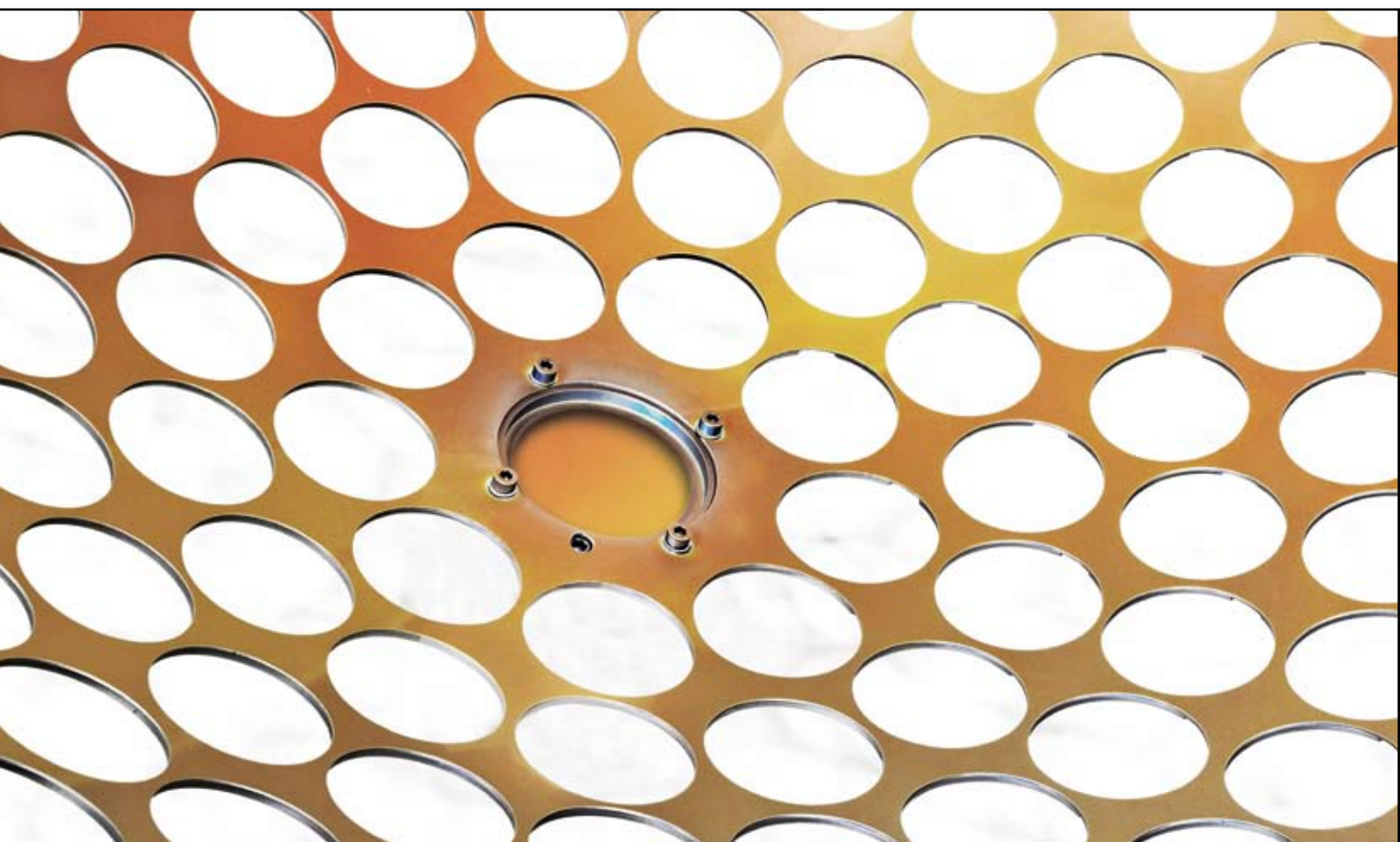
process is enabled by our SYpro-Controlling System. The systems and the components are designed and proven for 24-hour-operation. And the high performance production package is completed by a short pumping-down time.

The systems can be build up modularly for customized requirements: various components can be installed as calotte or planetary system, various sizes of e-beam gun evaporators, thermal evaporators, heating from bottom and top, optical and crystal monitoring, and APS*pro* are all possible variations and choices.

### SYRUS*pro* family

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1500	Highest productivity from flat to extremely curved substrates
1100	Standard optical coating production system
900	Medium size production system for optical coatings
700	Ideally suited for flexible small batch production
DUV	Low loss coatings for Deep Ultraviolet Applications
CFM	High Performance Coatings for Digital Optics



## **APSpro**

### ADVANCED PLASMA SOURCE

The powerful *APSpro* for Plasma Ion Assisted Deposition (PIAD) is a highly cost-effective method of production. The coating process is performed at low temperatures, which makes any additional heating unnecessary. *APSpro* has the unique ability to produce shift-free optical coatings. It is fit for high performance coatings on glass, plastics or even semiconductor substrates, yielding smooth and amorphous films with low scattering and absorption.

## **HPE6-HPE10-HPE12**

### THE ELECTRON BEAM SOURCES

A programmable range of evaporation patterns is among the developments which are typical of the latest generation of electron beam evaporation sources produced by our company. Up to 10 kilowatts of active power ensure a high rate of evaporation, unsurpassed flexibility, repeatability and increased production uptimes. Thanks to the modular design the cathode unit and the crucible are readily accessible, which allows them to be exchanged quickly and easily. The 270-degree-deflection-angle protects the filament from ion bombardment, thus prolonging their life time. The LEYBOLD OPTICS electron beam sources are a completely integrated part of the *SYRUSpro* system idea and can be controlled and monitored by its control architecture.

## **OMS**

### OPTICAL MONITORING SYSTEM

The major advantages of the *SYRUSpro* system are not only its high productivity, but also the high accuracy and the ability to achieve tight process specifications. OMS is a unique tool for in-situ optical monitoring. The optical thickness can be measured on a test-slide changer, but for highest accuracy also directly on the substrate of the calotte. LEYBOLD OPTICS' optical monitoring has single- and multi-wavelength

capability, automatic pre-calculation and linear online correction of the trigger points. Results from layer design programs can be transferred directly. The OMS is completely embedded in the *SYproCS* controlling system, so that fully automatic operation ensures reproducible and stable coating results.

## **SYproCS**

### CONTROL SYSTEM

*SYproCS* makes programming highly flexible and facilitates the handling of even the most complex and demanding multi-layer processes. Its modular design helps to combine advanced technology with our established process expertise. For ergonomic operation, the control system is run from a touch-screen, on which all machine and process parameters can safely be controlled. The parameters are also monitored in data logging files. Thanks to *SYproCS*, operation support can be provided via modem connection from the LEYBOLD OPTICS engineering departments. The modern software structure allows for the integration of the controlling system into the company network.

## **CUSTOMER SUPPORT**

Even after the products of the various spheres of our business have been handed over to our customers, our customer support provides comprehensive service worldwide. Our staff offer assistance in new process set up, supply spare parts and consumables. The support specialists also concern themselves with used systems and retrofits.

Stay one step ahead - with LEYBOLD OPTICS.



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