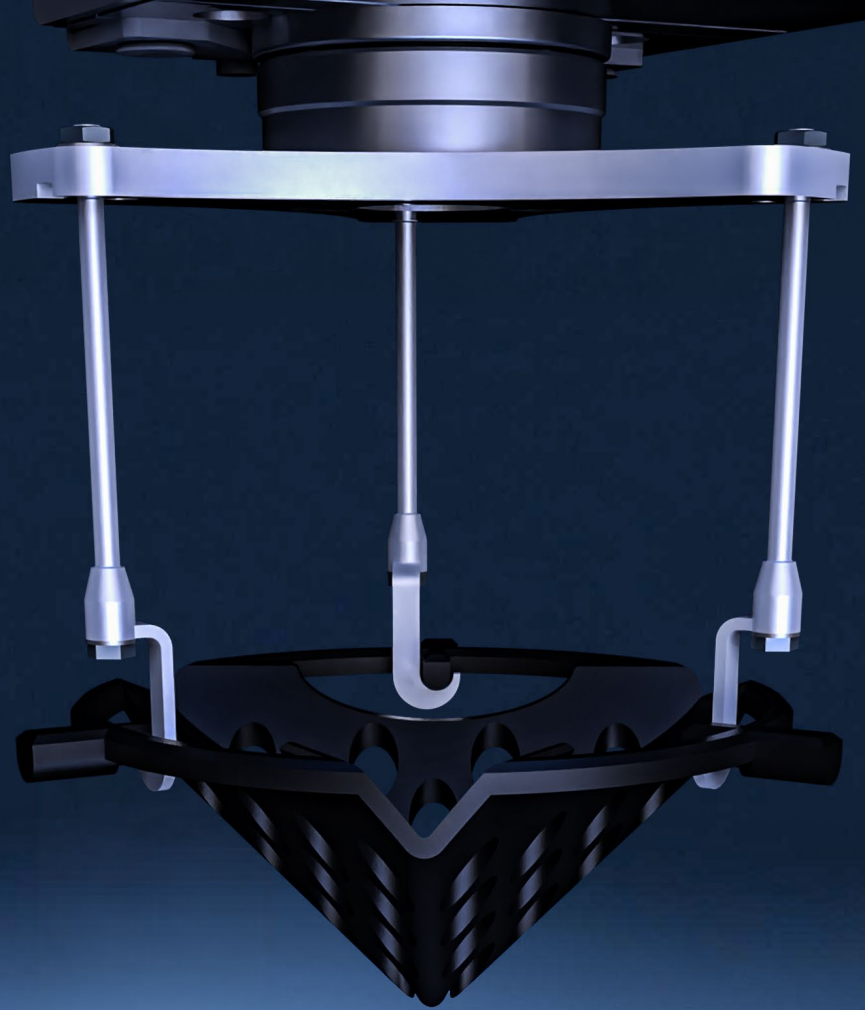




DIMENSIONICS
DENSITY



THE FUTURE OF
DENSITY DETERMINATION

FULLY AUTOMATED, PRECISE AND FAST

THE DIMENSIONICS DENSITY L IS THE ELITE VERSION OF THE MODEL RANGE AND OFFERS THE FULL SCOPE FOR DETERMINING THE DENSITY OF YOUR PRODUCTS



At Dimensionics Density, we see ourselves as experts in determining density in a production environment. The “Dimensionics Density” density platform is more than just a system for your process optimisation. It is a solution for greater efficiency in numerous industries.

Determining the mass density of production parts plays an essential role in industrial production and quality control. Dimensionics Density has developed a groundbreaking innovation that makes it possible to precisely analyse material and product properties and optimise manufacturing processes using automated density measurement processes.

If you have any questions or requests regarding our product

please feel free to contact me personally. We look forward to hearing from you.

Jan Wenzel
CEO, Geschäftsführer



The future of density determination

The DIMENSIONICS DENSITY is a metrological system, developed for the non-destructive and highly accurate density determination of a wide variety of components.



Dimensionics Density is an advanced, automated density measurement system based on the Archimedes principle. This principle enables the precise determination of material density by measuring the displacement volume of a liquid. This classic principle has been raised to a new level thanks to state-of-the-art technology.

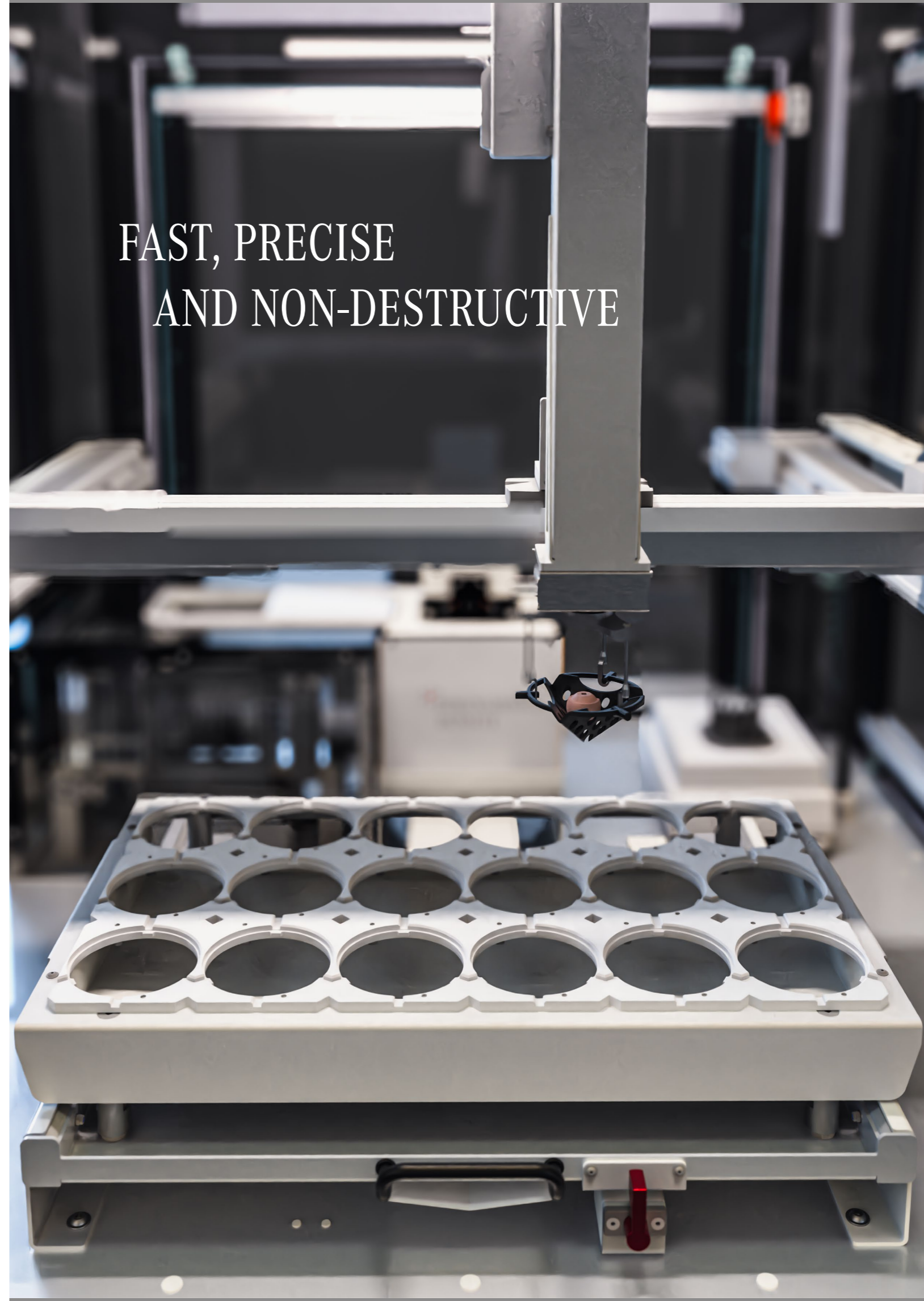
The automation of the process brings considerable advantages:

The measurement process is significantly accelerated, the accuracy of the results is increased and the repeatability of the measurements is guaranteed, as the human influence factor and external disturbance variables are eliminated. This leads to more efficient and sustainable processes for your production.

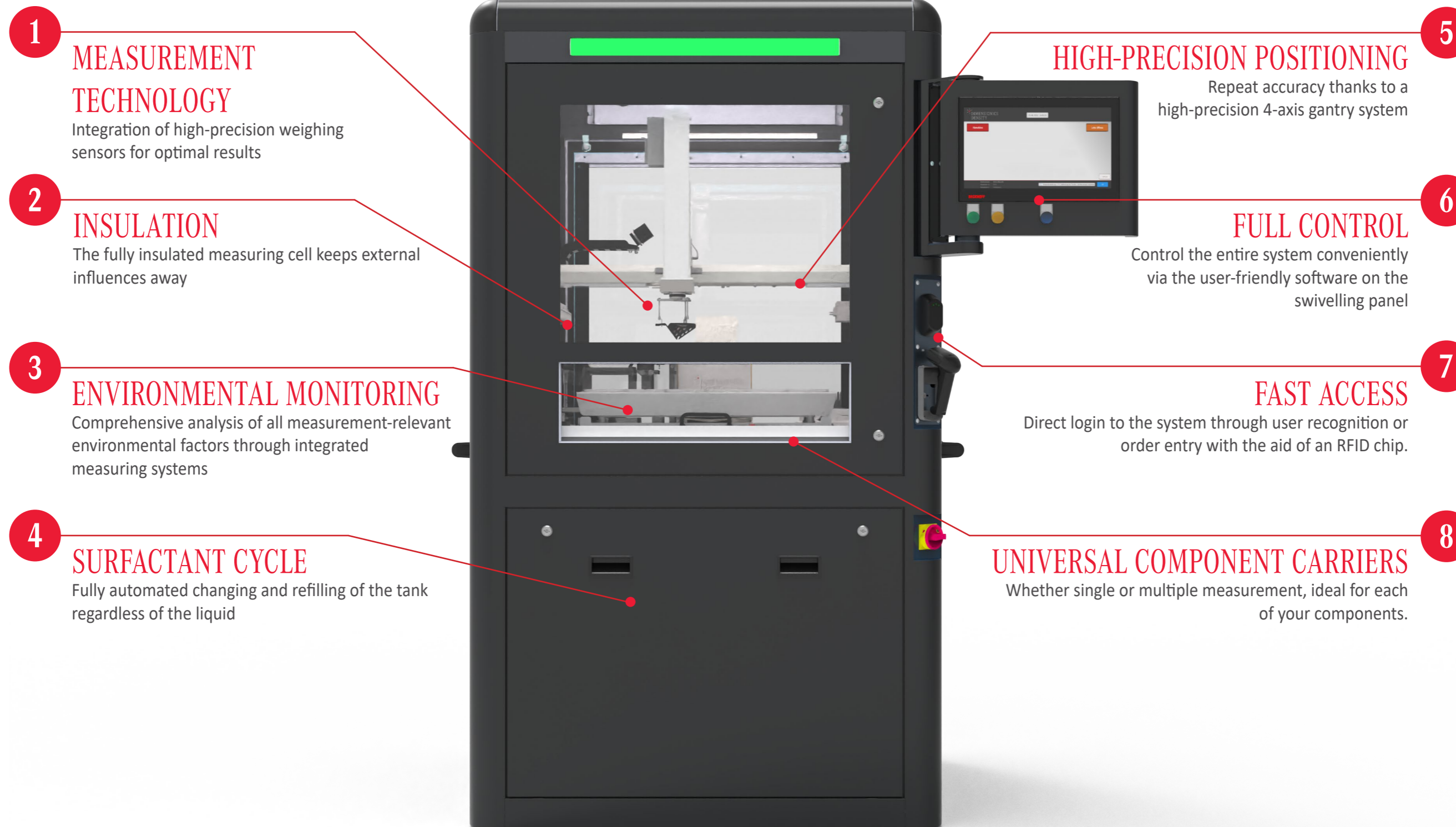
System features:

- Fully automated density determination directly in the production environment
- Density determination of green parts and water-drawing components
- Density determination with maximum precision (up to 0.001 g/cm³)
- High cycle speed (less than 1 minute per measurement)
- Automated recording and processing of all environmental parameters
- Traceability of measurement results (certified density standard)
- Non-destructive density determination (NDT)

FAST, PRECISE
AND NON-DESTRUCTIVE



Discover the numerous features of the DIMENSIONICS DENSITY



1

MEASUREMENT TECHNOLOGY

Integration of high-precision weighing sensors for optimal results

2

INSULATION

The fully insulated measuring cell keeps external influences away

3

ENVIRONMENTAL MONITORING

Comprehensive analysis of all measurement-relevant environmental factors through integrated measuring systems

4

SURFACTANT CYCLE

Fully automated changing and refilling of the tank regardless of the liquid

5

HIGH-PRECISION POSITIONING

Repeat accuracy thanks to a high-precision 4-axis gantry system

6

FULL CONTROL

Control the entire system conveniently via the user-friendly software on the swivelling panel

7

FAST ACCESS

Direct login to the system through user recognition or order entry with the aid of an RFID chip.

8

UNIVERSAL COMPONENT CARRIERS

Whether single or multiple measurement, ideal for each of your components.

Perfect control, fast work, high-precision results.

You can find more features at: www.dimensionics-density.com



PRECISE DENSITY DETERMINATION OF GREEN PARTS

New possibilities for you: Density determination of green parts

The automation of the process offers your company numerous new opportunities to organise your own process even more effectively and gain new knowledge.

Determining density is a complex subject and Archimedes' principle divides opinions. On the one hand, it is considered to be the most accurate method of determining the density of a body. On the other hand, there are challenges and limitations that make companies look for alternatives.

At Dimensionics Density, we don't just want to solve these obstacles through complete automation. We go one step further and create opportunities to expand the classic method into the most economical method for determining density. By automating the process, the user is able to determine the density of water-absorbing components with repeatable accuracy.

The water absorption of the component is precisely recorded by the wet weighing unit and can be mathematically extrapolated.

This is automated by the in-house algorithm and enables precise and non-destructive density de-

termination of green parts without pre-treatment. Another advantage resulting from the elimination of the human influence factor is the repeatable density determination of very small components with a mass of up to 1 gram. These cannot be validated reliably using manual methods.



Advantages of automation:

- Density determination of small components (up to 1g)
- Density determination of green parts and water-absorbing components
- Determination of various parameters of a component (density, volume, porosity, etc.)
- Parameterisation of production systems (presses, injection moulding systems, 3D printers, etc.)
- Determination of the shrinkage dimension of workpieces before firing
- Increasing the cost-effectiveness and efficiency of the process
- Gain new insights into your own production by analysing the component in detail

The perfect process control

The interaction between the selected components and the specially developed software guarantees the best results for your process for every DIMENSIONICS DENSITY model.

The heart of DIMENSIONICS DENSITY is the in-house algorithm, which delivers precise results and extrapolates their influence through the complex processing of all the influencing parameters recorded by the sensors.

The complexity of the calculation contrasts with the intuitive control of the system. This takes place via the installed HMI panel and offers a wide range of functions that are easy to access in the user-friendly menu, regardless of the model variant. All process-relevant tasks such as changing the liquid and taring the scales are performed automatically.

The range of functions offers the user numerous options for all aspects of their production process. Interfaces in the system communicate with higher-level ERP systems and peripheral devices.

Measured values are processed automatically and saved in the implemented measurement history. The integrated administrator area enables user management and assignment of user level rights. This guarantees more security for you and your production. Do you have new component variants? No problem, because the creation of new recipes is designed to be beginner-friendly and offers you sufficient freedom. Various measurement modes for special applications round off the package and guarantee maximum control over your process.

Dimensionics Density also offers customised software solutions for special requirements. Our experts implement customer requests and design output protocols and functions according to your requirements profile.

- Full process monitoring & user-friendly control
- Recording and processing of environmental parameters
- Correction functions (extrapolation of water absorption/environmental influences etc.)
- Interface communication with higher-level systems and peripheral devices
- Integrated measurement history and documentation functions
- Customised and intuitive recipe design for new component types/properties
- Administrator area and user management
- Rights management customised to your requirements
- Customised packages and software developments can be added



Versatile in use

Every industry has special requirements for density determination and therefore also unique added value.

Density determination in medical technology



Density plays an important role in the field of medical implants, as it provides information on the quality of the end product or is required for the parameterisation of subsequent processes. Highly accurate measurement results are essential in order to fulfil this high quality standard in the production of implants.

The traceability of the measurement results is particularly important here. Practical comparisons with conventional methods, such as manual density determination by a laboratory technician, also show a reduction in cycle time per measurement of up to 80%. This, in combination with the automated measurement of up to 15 components in one measurement cycle, enables 100% control for the examination of medical implants.

Density determination in ceramic production



The DIMENSIONICS DENSITY is able to analyse the density of ceramic green bodies of different types. Even complex geometries with small openings and undercuts can be measured without bubble adhesion thanks to the use of a special surfactant solution.

Due to the open porosity of green compacts, they can become saturated in the water basin. Thanks to the automated process, this process can be recorded and then extrapolated in the algorithm. This enables the shrinkage behaviour of components to be predicted via direct correlation and can therefore avoid unnecessary incorrect firing. This makes the process more efficient and ensures greater sustainability.

The DIMENSIONICS DENSITY is designed for individual, customer-specific customisation requirements. Whether individual measurement or testing as 100 per cent control, DIMENSIONICS DENSITY offers the right solution for everyone. The scalability of the system and its adaptability to specific customer requirements allow maximum flexibility for use in different industries.



Density determination in additive manufacturing



In additive manufacturing, micrograph analyses are currently the measure of all things in order to assess the porosity of the components or the printed density cubes. This process is very time-consuming and ties up employee resources for a long period of time. In addition, no classic traceability to calibration standards is possible, as grey value binarisation takes place depending on the parameter set. A single micrograph also only ever shows a „snapshot“ of the component and therefore not a truly complete evaluation of the entire part. This is avoided by the automated measuring operation of DIMENSIONICS DENSITY.

Initial studies show a direct correlation between micrograph analyses and the determination of porosity via density. This means that porosity determination via volume density using DIMENSIONICS DENSITY is a calibrated and traceable solution.

Density determination in powder metallurgy



Powder metallurgically produced components play an important role in industry. Their advantages lie in their high dimensional accuracy and their wide range of densities, from highly porous to highly dense. The density of the workpieces plays a decisive role here. For example, the bulk density of the powder influences the strength, porosity and other parameters of the moulded part. The aim is to eliminate blowholes or similar defects that affect the porosity and stability of the components.

An important aspect here is the ability to quickly analyse the density of several segments of a component in succession. In order to automate this complex and dangerous process, DIMENSIONICS DENSITY offers the option of expanding the existing system with a (partially) automated segmentation station on request.

Discover our model range DIMENSIONICS DENSITY

XS

M

L

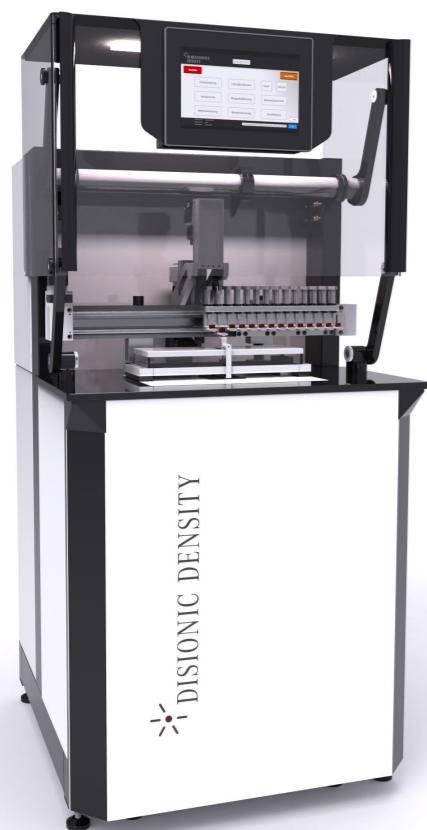


Our DIMENSIONICS DENSITY model range includes different versions of our density platform for every possible application, suitably designed and configured.

Depending on the broad spectrum of our customers' processes, our engineers have developed a wide variety of models that have been specifically adapted to the requirement profiles in terms of their size, function and accuracy.

The throughput of samples and the complexity of the components play the decisive role here.

DIMENSIONICS DENSITY GmbH offers the full range of density measurement services, from the measurement of individual samples to a complete 100% inspection. Each model variant guarantees the high standard of processing and component selection that Dimensionics Density has stood for over the years.



All systems utilise the Archimedean principle and offer maximum precision and unrivalled repeatability thanks to the complete automation of the process.

Only the L model series is designed for full automation and therefore offers users the option of being fully integrated into an existing process. We encourage you to convince yourself of the

quality of our systems. You can find more information about our systems on our website: (QR Code – eng website)





THE ADDITIVE SOLUTION

The DIMENSIONICS DENSITY XS is the smallest model in the series and is characterised by its compact design and high accuracy. To make the small installation space possible, a measuring system was developed in which both dry and wet weighing are realised by one scale. The DIMENSIONICS DENSITY XS is based on the classic design of a Jolly scale.

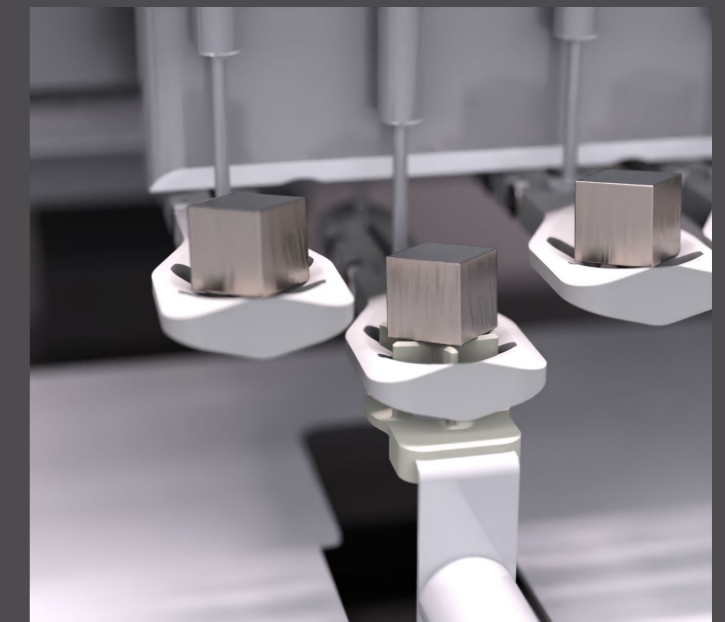
The DIMENSIONICS DENSITY XS is designed for measuring the smallest components with regular spherical and cubic shapes. After manual loading of the integrated measuring battery, it offers the possibility of fully automated testing of up to 15 samples. The measurements are moved to the measuring positions by a 2-level transport unit.

The system offers complete processing of the measured values for the QM system and can be



easily linked to higher-level ERP systems. The creation of own recipes is limited compared to other models.

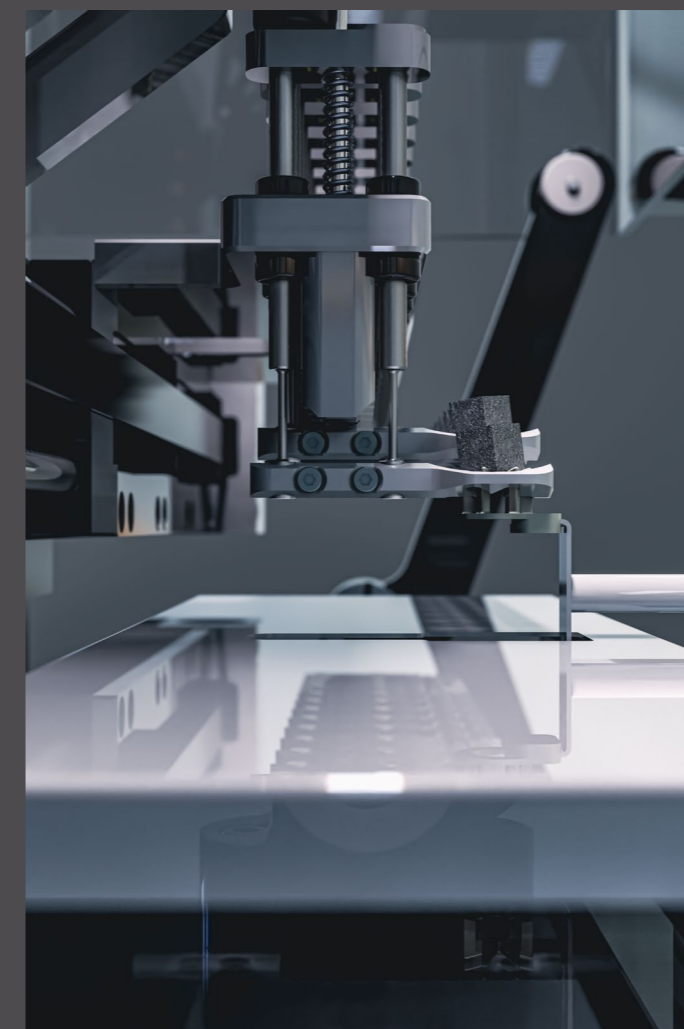
The system is ideal for additive applications to



analyse co-printed density cubes. These can be analysed quickly and precisely. The density obtained is compared with the stored characteristic data and, thanks to direct correlation, the porosity of the component can be calculated.

DIMENSIONICS DENSITY XS

Components per measurement	15
Cycle time for one measurement	ca. 1 min
Measuring accuracy	$\pm 0.005 \text{ g/cm}^3$
Measurements density $< 1 \text{ g/cm}^3$	no
Measurement of complex components	no
Number of integrated scales	1
Creation of own measurement recipes	limited
Automation options	no
Dust protection class IP6X	no
Modular software packages	limited
Calibration standard	no





THE LABORATORY SYSTEM

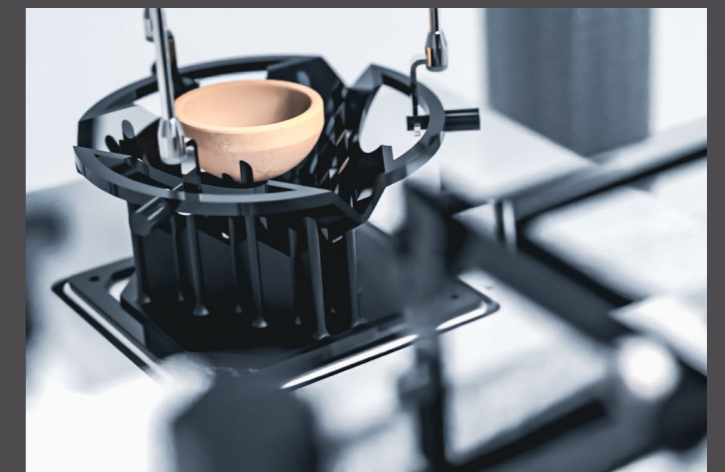


The DIMENSIONICS DENSITY M is designed for automation and support in the laboratory. With a number of 4 measurement samples in one cycle, it is designed for smaller quantities.

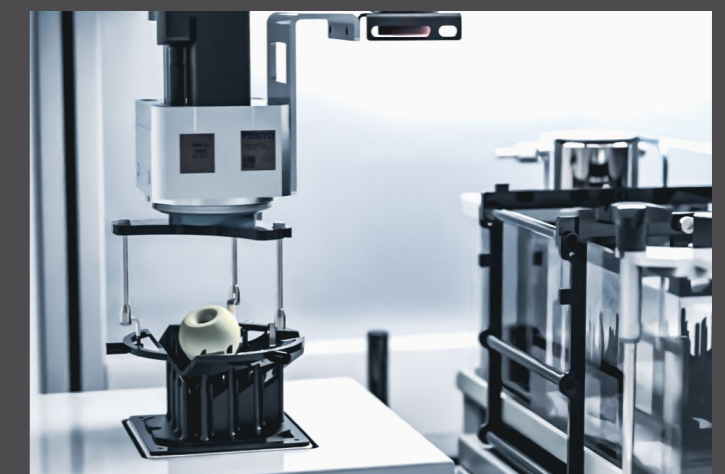
However, the low cycle time of approx. 1 minute per measuring cycle and the high precision provide optimum insight into your process. An installed surfactant circuit and other comfort features allow intuitive handling of the system. The integrated swivelling HMI panel, together with the user-friendly software, ensures that your employees work with maximum efficiency.

The M model series comes with a large number of integrated features. User and authorisation management is integrated, as is the feature history, which displays the characteristic values.

Due to its low number of units and the associa-



ted design customisation, it is the fastest of all models for complex components and can therefore be used optimally for fast approvals. As with the L model, the results are traceable to a state-certified density standard and are therefo-



re ideal for companies operating in accordance with ISO 9001.

The M model series is an ideal introduction to quality assurance through density determination for any company. We will be happy to advise you on individual enquiries.

DIMENSIONICS DENSITY M

Components per measurement	4
Cycle time for one measurement	ca. 1 min
Measuring accuracy	± 0.003 g/cm ³
Measurements density < 1 g/cm ³	limited
Measurement of complex components	yes
Number of integrated scales	2
Creation of own measurement recipes	yes
Automation options	no
Dust protection class IP6X	yes
Modular software packages	limited
Calibration standard	yes

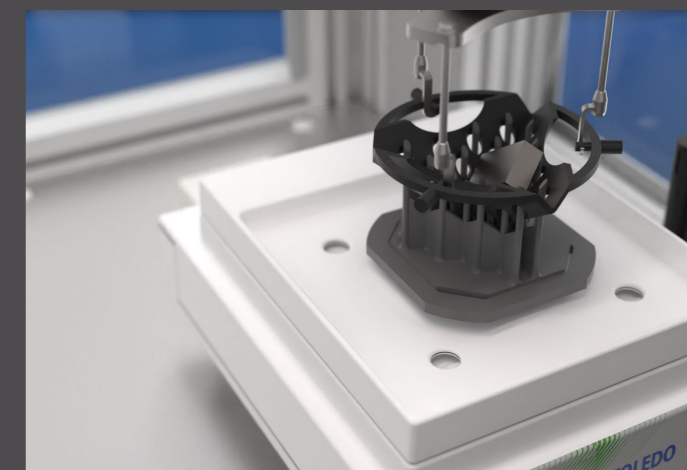


THE ALLROUNDER

The DIMENSIONICS DENSITY L is the premium system and offers full process control & process tracking. The system can be used for high-precision testing of large quantities. As standard, the DIMENSIONICS DENSITY L offers space for up to 18 samples. However, this number can be extended at the customer's request.

A fully automated surfactant circuit guarantees trouble-free operation. The low cycle time of less than 2 minutes per measuring cycle, the high precision and the possibility of complete process integration make this model a premium product. The system offers complete dust protection. The integrated sensor system measures all relevant environmental factors and integrates their influences into the calculation of the density values.

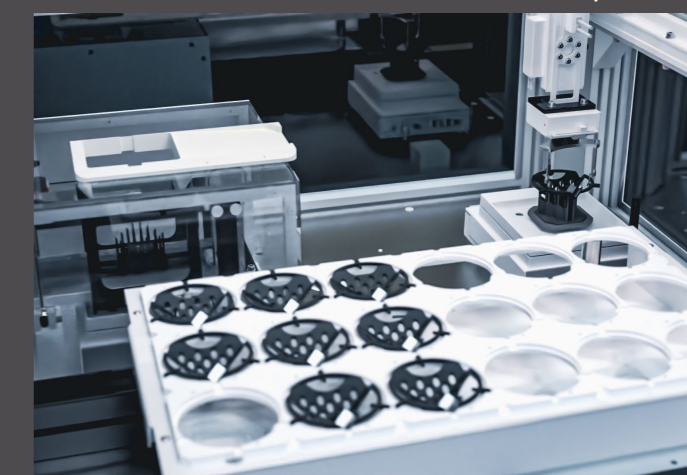
The L model series offers the largest number



of integrated features. The feature history has a graphical background and allows you to recognise trends in production more quickly. The parameterisation of the system and test jobs is available for all systems, but the L model series offers the greatest scope.

The model is designed for individual customisation of the software and can be tailored to customer requirements. It therefore offers the maximum adaptability of all models to your process.

In addition, the L model offers the option of



complete automation with regard to upstream processes, such as the loading of component carriers, drying stations or segmentation systems. We will be happy to advise you on individual enquiries.

DIMENSIONICS DENSITY **L**



Components per measurement	18 (erweiterbar)
Cycle time for one measurement	ca. 1,5 min
Measuring accuracy	± 0.001 g/cm ³
Measurements density < 1 g/cm ³	yes
Measurement of complex components	yes
Number of integrated scales	2
Creation of own measurement recipes	yes
Automation options	yes
Dust protection class IP6X	yes
Modular software packages	yes
Calibration standard	yes



DIMENSIONICS DENSITY: More than a product

With the DIMENSIONICS DENSITY density scale, we offer more than just the technology for your process. We see ourselves as a partner in all areas of density determination and would like to provide our customers with comprehensive support. We offer various services to support you in solving tasks in your company. Our ambition is to make your process safe and guarantee you the best experience with our products.

Feasibility studies

Every task has its own individual requirements. DIMENSIONICS DENSITY GmbH offers feasibility studies to give you certainty when deciding to purchase our systems and to fully analyse all your requirements. We test your components in the process, develop solution strategies and concepts for the treatment of the parts and provide you with a comprehensive analysis of the results. Your safety and that of your investment is our maxim. The costs incurred will be charged pro rata when purchasing a system.

SERVICE & MAINTENANCE CONTRACTS

DIMENSIONICS DENSITY GmbH offers you optional service and maintenance contracts to ensure the long-term functionality of our systems. Take advantage of our trained personnel, who will carry out the maintenance of your system with expertise at set intervals. Service contracts offer optimum protection for your system.

Order measurements

Do you have components that need to be measured, but you don't have the capacity for testing? Send us your components and we will determine the density for you.

Development and research

If you have requirements that cannot be realised with our current systems, you can work with us as a partner to plan a development that fully maps your process.

- Sample pre-treatment
- Testing of different media
- Adaptation of alternative processes



Validation of processes

Would you like to validate a process in-house? We will be happy to support you in an advisory capacity and in carrying out the validation. Benefit from the expertise of our development department for your company.

Add-ons

The DIMENSIONICS DENSITY can be ideally customised to your individual process thanks to numerous expansion options. This allows the functionality of DIMENSIONICS DENSITY to be expanded and integration into your operating processes to be simplified. Benefit from the numerous developments of our company or contribute your own requests. Our engineers look forward to your enquiry.

System customisation

Would you like to customise the system to your specific requirements profile? We customise your basic version of DIMENSIONICS DENSITY to meet your needs. Our team of innovative engineers is waiting for your task.

Examples of customisation:

- Extension of the maximum number of component samples to be measured
- Integration of automated loading and unloading
- Customisation of the software to customer requirements
- Automatic component recognition
- Segmentation station
- Drying station for measured components
- Mixing system for the surfactant solution
- Customised component carriers





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Gefördert durch:



Bundesministerium
für Wirtschaft
und Energie

aufgrund eines Beschlusses
des Deutschen Bundestages



Europäische Fonds EFRE, ESF und ELER
in Mecklenburg-Vorpommern 2014-2020

