GVT – Forschungs-Gesellschaft Verfahrens-Technik e.V. I Theodor-Heuss-Allee 25 I 60486 Frankfurt/Main I Fax: 069 7564-437

Binding registration for the course:

Drying – Fundamentals and Applications
March 27th – 30st, 2023 I Magdeburg

Name

Title / First name

Company / Department

Street

Cip code / City / Country

Phone / Fax

Email

Registration of GVT professional course

BILLING ADDRESS

GVT-Member ☐ Yes ☐ No

Company

Department

Street

Cip code / City

☐ I have been informed about my right to object to the use of my data at any time.

Date / Sign

General Information

PARTICIPATION FEE

Non-members € 1.650,- (registration via Semigator: 1834,- €)
GVT-Members € 1.575,- (registration via Semigator: 1750,- €)

The participation fee includes comprehensive course materials (lecture slides, notes on laboratory work and tutorials), refreshments, lunches, and dinner at the 3rd evening.
Please do not remit the course fee before receiving confirmation of attendance and the invoice. Upon cancellation before **March 10, 2023**, we remit the fee less 50 Euro handling costs. Upon later cancellations no remittance is possible, however, the course documents will be sent. Furthermore you may nominate a substitute participant. Course fees are sales tax free.

REGISTRATION

Please register online at **www.gvt.org/hochschulkurse** not later than **March 10, 2023**. The number of participants is limited.

ACCOMMODATION

Hotel Ratswaage Magdeburg (15 min. walking distance) offers single rooms with breakfast and use of wellness facilities for a special rate upon availability.
Keyword: University Course Drying
Tel.: +49 391 5926192, Fax: +49 391 5619615
Email: reservierung@ratswaage.de
www.ratswaage.de

PRIVACY POLICY

You have the right to withdraw a given consent at any time.
Details about our privacy policy can be found at
www.gvt.org/Datenschutz.

INFORMATION

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In Cooperation with DECHEMA e.V.

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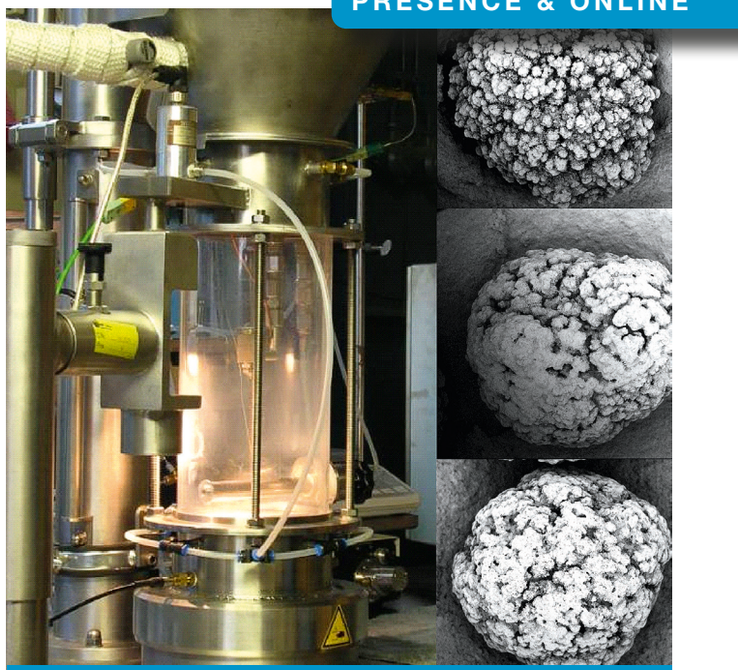
GVT **PROFESSIONAL COURSE**

HYBRID EVENT: PRESENCE & ONLINE



March 27th - 30st, 2023
Magdeburg

Drying

Fundamentals and Applications

Directed by:

Prof. Evangelos Tsotsas
Otto von Guericke University Magdeburg

Prof. Stefan Heinrich
Hamburg University of Technology

Organizer

GVT Forschungs-Gesellschaft Verfahrens-Technik e.V.

In cooperation with

TVT THERMISCHE VERFAHRENSTECHNIK OTTO-VON-GUERICKE UNIVERSITÄT MAGDEBURG

Course Programme

Fundamentals of drying technology

- Goals of drying: product quality and process efficiency
- Relevant material properties (sorption, water activity, glass transition etc.)
- Particle / product formulation by drying
- Drying methods, types of dryers, dryer selection

Properties of wet air, capacity of convective dryers

- States and processes on psychrometric charts
- Adiabatic saturation temperature
- Air conditions in and capacity of convective dryers

Moisture measurement

- Gas moisture, particle / solids moisture

Drying kinetics of single particles or droplets

- Wet bulb temperature, drying curve, drying periods
- Methods of measurement or of indirect determination
- Normalization, second drying period models
- Understanding drying with the help of pore networks

Course Programme

Major drying processes: Equipment, dryer design, scale up

- Generic examples of convective dryer design
- Fluidized bed drying
- Spray drying
- Vacuum contact drying, freeze drying

Special drying processes and their application

- Atmospheric freeze drying, microwave and high-frequency drying, microwave vacuum / freeze drying, superheated steam drying, impingement drying, supercritical drying

Laboratory work (guided exercises and demonstrations)

- Various equipment for moisture measurement, particle characterization, drying
- Drying kinetics of droplets in the acoustic levitator
- Drying kinetics of particles in the magnetic suspension balance
- Batch and continuous fluidized bed drying

Tutorials (guided practical computations and simulations)

- Exercises on material properties, wet air, dryer capacity
- Evaluation of drying kinetics for single droplets and particles
- Fluidized bed dryer design and scale-up (batch, continuous)
- CFD simulation of spray dryers

Venue / Lecturer

VENUE (for participants on site)

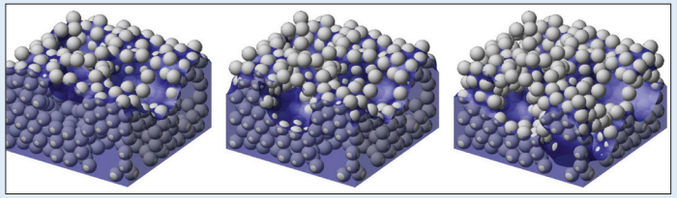
Otto von Guericke University Magdeburg
Bld. 10-110 and various labs
Universitätsplatz 2
39106 Magdeburg
Germany

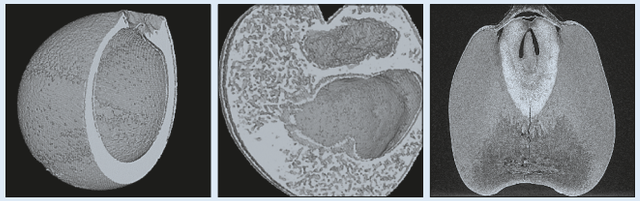
LECTURERS

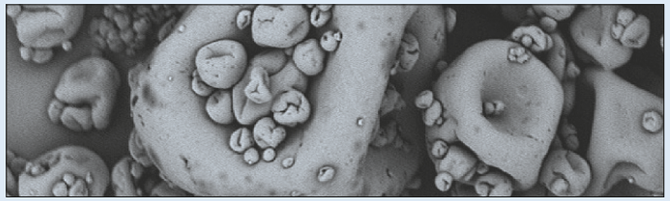
Prof. Evangelos Tsotsas	Otto von Guericke University Magdeburg
Priv.-Doz. Dr.-Ing. Abdolreza Kharaghani	Otto von Guericke University Magdeburg
Prof. Stefan Heinrich	Hamburg University of Technology

External speakers

Prof. Andreas Bück	FAU Erlangen-Nuremberg
Dr.-Ing. Michael Jacob	Glatt Ingenieurtechnik GmbH, Weimar
Prof. Mirko Peglow	IPT-Pergande GmbH, Weißandt-Gölzau
Dr. Roland Wernecke	Dr. Wernecke Feuchtemesstechnik GmbH, Potsdam
Dr. Maciej Jaskulski	Lodz University of Technology







TARGET AUDIENCE

The course is designed for people from various backgrounds (engineers, chemists, food and pharmaceutical technologists) and with different levels of experience, who need to understand the fundamentals of modern drying technology and apply them to produce better solid / particulate products with more efficient drying processes. The course language is English.

TOPIC

Almost every material used in solid form (from foods to pharmaceuticals, from minerals to detergents, from polymers to paper, from raw materials and commodities to highly formulated specialties) is dried during production. Drying technology is, therefore, a continuously developing field with various challenges referring to process design, development, operation and automation, to equipment selection, development and use, as well as to the preservation or even creation of desired product properties. The purpose of the course is to provide the essentials of modern drying technology to the participants in a broad but compact way, at a high but understandable level close to practice.

The course starts at the very beginning (why shall materials be dried and how can this be done?), and then discusses: elementary approaches and methods (how does the drying medium used relate to the capacity of the process and to the achievable product moisture?); drying kinetics (why are certain materials more difficult to dry than other ones?); dryer design and scale up methods (how long will drying of a specific product take, how big will the dryer need to be?); instrumentation (how can gas moisture or even product moisture be measured and monitored in my equipment?); options and alternatives (why shall I use a certain drying method and the respective equipment, instead of another one?); and opportunities (how can I use drying for particle formulation, how can I reduce the energy demand of my process?). This is done in three complementary ways: Lectures, laboratory work (demonstration of experimental methods and equipment in one of the leading laboratories in drying technology), and tutorials (ranging from simple exercises to solidify the understanding of principles, and the guided evaluation of data measured in the lab, to the application of modern computational tools for dryer design).

Beginners in drying will take with them from the course the broad overview and the sound basis of skills that they need for their every-day work; experienced people will refresh their knowledge and renew their point of view up to the cutting-edge of drying technology in experimentation and modelling.