



**In-service Training Course for Specialists, Executives, Technicians & Planners working in the Food, Biotech, Pharmaceutical & Chemical Industry**

# Fluid Bed Technology: Fluidisation, Granulation/Coating and Drying

**May 22 - 24, 2024**

**At Phoenix Copenhagen in the Heart of Copenhagen,**

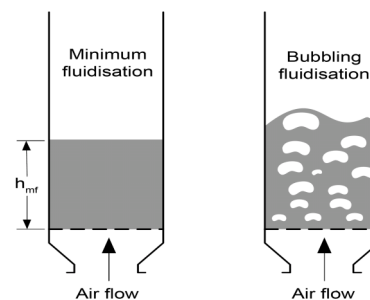
**Possibility to  
join online**

## Outcome

Through alternating presentations, exercises and plenum discussions participants will acquire solid basic knowledge of fluid bed technology and fluidisation and be able to address practical problems in these fields.

## Main subjects taught in the course

- Fluidisation and classification of particles
- Fluid bed designs - batch and continuous
- Formulation and process considerations
- Coating and agglomeration at particle level
- Scale-up of fluid bed systems
- Drying of solids in fluid beds
- Moisture in air
- Moisture in powder - product lumping
- Energy and mass balances
- Operational problems and how to solve them



## Target group

The course addresses specialists, executives, technicians, planners & plant designers working in the chemical, pharmaceutical, biotech and/or food industry with manufacture or development of particle products in batch or continuous fluid bed processes such as granulation, coating, agglomeration and/or drying.

## Form

The course runs for three consecutive days with alternating presentations, exercises and plenum discussions.

The course is held in English.

## Social event

On the afternoon of the first day the participants are invited to dinner in the colourful 17th century waterfront of Nyhavn in the heart of Copenhagen.

**Registration and further information: Please see the next pages**

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## Teacher

**Ph.D., Peter Dybdahl Hede**



- Specialist in industrial particle technology
- PhD in Fluid bed technology
- Many years of teaching experience from The Danish Society of Engineers and in-service training courses in particle technology
- Contact: PTHD@seydlitz.dk

**Co-presenters**

- Equipment manufacturers



**MICROTRAC**  
**MWB**  
PARTICLE CHARACTERIZATION

## Venue

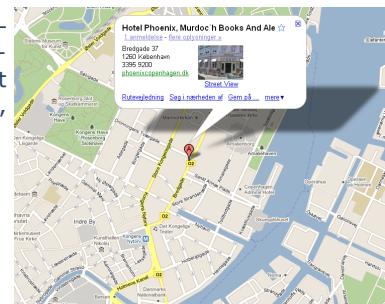


Phoenix Copenhagen is a 4-star deluxe hotel housed in one of Copenhagen's historic buildings. Situated in Copenhagen, near Amalienborg Palace, just a few metres' walk from Nyhavn, Kongens Nytorv, Strøget and other sights.

Address: **Bredgade 37, DK-1260 Copenhagen K, Denmark**

Telephone: **+45 33 95 95 00**

Booking & service: **bookphoenix@arp-hansen.dk**



## Fee

The course fee is payable in advance and includes course materials, scientific pocket calculator, coffee, water & refreshments, lunch all three days.

Physical presence: Per person EUR 2235,- plus VAT. VAT is reclaimable.

Online Presence: Per person EUR 1975,- (No VAT is charged)

Overnight stay at the delegates own expense can be arranged at the course venue or elsewhere nearby. Please contact Hotel Phoenix Copenhagen at **+45 33 95 95 00** or **bookphoenix@arp-hansen.dk**.

Kindly note that central Copenhagen is very popular in spring time and that Copenhagen hotels may be fully booked well in advance.

## Registration

Binding registration at [www.seydlitz.dk/courses](http://www.seydlitz.dk/courses) no later than 1st of April 2024. In case of any questions please contact **info@seydlitz.dk** or phone **+45 44 10 87 00**.

The course may be subject to cancellation in case of too few participants.

**SEYDLITZ**  
**UNITED CONSULTANTS**

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# Fluid Bed Technology: Fluidisation, Granulation/Coating and Drying

May 22 - 24, 2024

## Course contents

**CEST  
time zone**

### Day 1: Subject

10.00 - 10.15	Course introduction
10.15 - 12.00	Particles and particle size distributions Particle shape and sphericity Measurement of particle size
12.00 - 13.00	Lunch
13.00 - 14.00	Particle characterisation
14.00 - 14.45	Single particles in fluids Stokes law Terminal velocity Particles falling under gravity in a fluid Stokes stopping distance
14.45 - 16.30	Multiple particles in fluids Fluidisation theory, types of fluidisation Minimum fluidisation velocity Pressure drop estimations, Two-phase theory, Geldart Chart Classification of particles, bubbles - diameter and bubble rise velocity Expanded bed height, elutriation, fluidisation regimes
18.00 - 20.30	Dinner in Nyhavn



### Day 2: Subject

9.00 - 10.00	Fluidisation flow modes and mixing in fluid beds  Introduction to fluid bed granulation and coating Industrial examples of granulated products
10.00 - 12.00	Fluid bed granulation/coating – equipment design and operations
12.00 - 13.00	Lunch
13.00 - 15.30	Fluid bed designs - top-spray, Wurster, tangential - batch vs. continuous fluid beds Back-mix vs. plug flow Use of fluidisation: Powder transport via fluidization -dense-phase/dilute-phase transport Saltation & choking velocity How to control a fluid bed process Filter systems and safety installations Atomisation: Two-fluid nozzles and the influence of droplets and droplet size Agglomeration and coating at particle level - viscous Stokes granulation theory Mechanical strength of granulates Modelling of granulation processes (DEM, population balances, CFD) Scale-up of fluid bed granulation systems, Practical correlations
15.30 - 16.00	Operational problems in fluidised beds





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## Course contents - continued

**CEST  
time zone**

Day 3:	Subject
9.00 - 9.30	Mass and energy balances in fluid bed drying Drying and energy consumption - how can we save energy?
9.30 - 10.30	Moisture in air, H-X diagrams and how to use it for fluid bed drying estimations
10.30 - 11.00	Moisture in powder When powders lump: Common problems with moisture in powder
11.00 - 12.00	Design of fluid beds for granulation and coating processes 
12.00 - 13.00	Lunch
13.00 - 15.00	Design of fluid beds for gran. and coating processes (continued) Design of fluid beds for drying processes Case examples 
15.00 - 15.45	Formulation issues when working with products produced in fluid beds Case example from the biotech industry
15.45 - 16.00	Final remarks, Course evaluation



 **VISITCOPENHAGEN** THE OFFICIAL WEBSITE

Please see all of our courses at:  
[www.seydlitz.dk/courses](http://www.seydlitz.dk/courses)