



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, 2019

**More than 250
persons taught**

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 in fluid beds
- Moisture in air and powder
- 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.

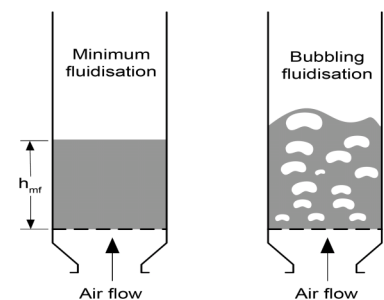
Form

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 on a one-hour guided harbour tour followed by 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., HD 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

Neuhaus Neotec - Particle Engineering with Fluidised Bed Technologies

- Equipment manufacturer



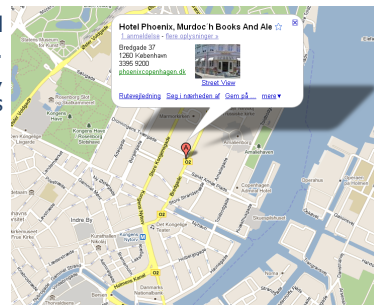
Venue



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 & refreshments, lunch all three days as well as canal tour and dinner on the first evening.

Per delegate EUR 2085,- plus VAT. VAT is reclaimable.

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 no later than 1st of April 2019. In case of any questions please contact info@seydlitz.dk or phone **+45 29 49 30 40**.

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

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Course contents

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 - 13.45	Single particles in fluids Stokes law Terminal velocity Particles falling under gravity in a fluid Stokes stopping distance
13.45 - 16.00	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
16.30 - 21.30	Walk & Canal tour in the Copenhagen Harbour, dinner in Nyhavn
Day 2:	Subject
9.00 - 12.00	Fluidisation flow modes and mixing in fluid beds Use of fluidisation: Powder transport via fluidization -dense-phase/dilute-phase transport Saltation & choking velocity Introduction to fluid bed granulation and coating Industrial examples of granulated products
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 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	Dust explosions Introduction to ATEX

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Course contents - continued

Day 3:	Subject
9.00 - 9.30	Operational problems in fluidised beds
9.30 - 10.00	Mass and energy balances in fluid bed drying Drying and energy consumption - how can we save energy?
10.00 - 11.30	Moisture in air, H-X diagrams and how to use it for fluid bed drying estimations
11.30 - 12.00	Moisture in powder When powders lump: Common problems with moisture in powder
12.00 - 13.00	Lunch
13.00 - 15.00	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