

POWDERS: THEIR PROPERTIES AND PROCESSING

1 - 3 October 2012



Parc Científic de Barcelona
Baldiri Reixac, 10
08028 Barcelona - Spain

Course Description

The primary purpose of this course is to review the various properties of powdered solids pertinent to the development and manufacture of the products of the pharmaceutical, cosmetic and allied industries. In particular, the latest experimental techniques and equipment for evaluating important properties of powders will be discussed and related to both the underlying principles and common industrial problems. The different powder processing operations will be discussed and the range of equipment and machinery for each will be critically reviewed.

Each topic will be briefly introduced at a fairly fundamental level, but will then be extended to cover more sophisticated and innovative techniques, emphasizing the practical usefulness whenever relevant. The formal sessions will be supplemented by informal discussion periods. You will be encouraged to raise specific problems.

Course Faculty

Dr. Cecil W. Propst is Director of R&D for SPI Pharma Group, Grand Haven, a processor of a variety of specialty ingredients for the food, drug, cosmetic and related industries. He was Director of Quality Assurance and Technical Development at Fleming and Company and, before that, President of Manufacturing Chemists. His duties included system design, product and process development, and regulatory affairs. Previously, he served as cGMP Facilities Director for the University of Maryland at Baltimore, in connection with the University's contract with the FDA.

Dr. Propst also served as Director of Technical Development for Stellar Manufacturing; Director of Quality Compliance for SmithKline Beecham; Director of Quality Assurance for Norcliff Thayer (a Revlon Company); and Group Leader/Product Development and Manager/Quality Control for Lewis Howe Company. He consults with TabTech for the chemical, diagnostic, food, engineering and beverage industries.

Course Topics Include:

- Powder Characterization
- Drying, Mixing and Handling Powder
- Extrusion and Spheronization
- Property Modifiers
- Quality by Design
- Applicable for the Pharmaceutical, Cosmetic and Allied Industries

Who Should Attend

The course is designed primarily for those concerned with products developed or manufactured from powdered solids in the pharmaceutical, cosmetic and related industries. Most of the material, however, will be general enough to prove valuable to a much wider range of interests including, but not limited to:

- Scientists
- Suppliers
- Technologists

Learning Objectives

Upon completion of this course, you will be able to:

- Identify the basic concepts applying to processing of powders
- Design, modify and control a process to produce products that have the desired properties
- Select tests to ensure the performance of the process.

Martin Thomas is currently Director of Business Development with Quantachrome Instruments, manufacturers of powder and particle characterization equipment. Dr. Thomas joined Quantachrome in 1991 as a Technical Service Manager. Since then he has also served as International Sales Manager, Director of Engineering and Director of Applied Technology. He has traveled extensively, especially to the Far East, providing application support to distributors and end-users alike. Prior to joining Quantachrome Dr. Thomas was a Principal Research Officer with ICI's catalyst business (now Johnson Matthey Catalysts) in Billingham UK where he was responsible for the operations of the powder characterization and thermal analysis laboratories. Immediately after leaving the University he joined Cookson Group's Central Research Laboratories with special responsibilities for powder characterization including powder X-ray diffraction. Dr. Thomas gained his doctorate from the University of Birmingham's (UK) Chemistry department for a study of nickel hydroxide, and is a co-author of the book entitled *Characterization of Porous Solids and Powders: Surface Area, Pore Size and Density* (2004 by Kluwer Academic).

FIRST DAY

8:30-9:00
Registration

9:00-17:00
Review of Learning Objectives/
Introduction to Program
Relevant Properties of Powders

- Single particle considerations, Structure
- Role of surface, Influence of defects
- Bulk Properties, Flow, Sampling

Mixing of Powders

- Properties of powders that affect mixing
- Mixing of minor ingredients
- Mixing mechanisms
- Particle size required
- Mixer selection
- Mixer sampling

Characteristics of Powder Particle Size and Shape

- Particle size analysis
- Distributions and their presentation
- Particle shape characterization

Mechanical Properties of Powders

- Deformation mechanisms
- Compression and consolidation
- Impact of starting porosity
- Force vs. porosity
- Force vs. compact strength
- Work of compaction

Characteristics of Particle Surface and Pores

- Surface Area by BET, Other methods, Pore size distribution, Characterization of Surface Texture

Handling, Milling and Micronization of Powders

- Mill related factors
- Material related factors
- Cryogenics
- Micronization of powder
- Pancake mills; loop mills
- Segregation mechanisms
- Segregation prevention by attachment/containment

SECOND DAY

9:00-16:30

Powder Property Modifiers

- Types and their properties
- Active ingredient enhancements
- Binders (Wet and dry)
- Fillers
- Disintegrants
- Surface ingredients

Powder Surface Free Energy and Cohesion

- Free surface energies; Water vapor adsorption; Cohesiveness Characterization

Tablet Presses and Compaction Systems

- Tablet compaction: single vs. rotary press

- Feed systems
- Press design
- Press selection

Structure/Polymorphism Characterization

- DSC and Thermal methods
- FTIR and Raman Spectroscopy
- X-Ray

Wet Processing of Powders

- Granule structure
- Wet particle properties and process selection
- Fluid bed process
- Influence of surface tension, viscosity and binder choice on granules
- Torque as a parameter in granule development monitoring

Drying of Powders

- Control of dryers
- Migration during drying
- Spray dryer considerations

THIRD DAY

9:00-16:00

Particle Size Enlargement with Pressure

- Roll Compaction/Roll Compaction Systems
- Screw extruders
- Axial vs. radial
- Pressure gradient and segregation
- Spheronizing; Ingredient requirements; Die plate design; System selection

Scale-Up Issues and Transfer Technology

- Scale-up methods (energy/volume, rate of change, and actual)
- Mixers, granulators and fluid beds

Fine Particle Characterization

- Dynamic light scattering (photon correlation spectroscopy), zeta potential, flocculation/agglomeration.
- Static electricity measurement/use

Powder Coating Technology

- Fluid Bed and Wurster Coating
- Coating material
- Microencapsulation

Quality by Design and Process Control

- Direct vs indirect measurement of functionality
- Online Measurements
- Establishing Specifications, Engineering, Controls, and Critical Parameters
- Research Data; Design Space, CVA and DOE
- Steps to implementation
- SPC vs Engineering Controls
- PAT, inline monitoring and comparisons to design

Assessment Opportunity

TUITION AND PAYMENT

Early registration: (received before July 27, 2012)
Euro 1750+VAT/1570+VAT (group discount*)

Regular registration: (received after July 27, 2012)
Euro 1950+VAT/1750+VAT (group discount*)

(Fee includes course materials, lunches and coffee breaks).
Participants are responsible for their own hotel reservations.

*Group discount is for two or more enrollments from the same company.

**Payable by bank transfer upon issuing an invoice.
Payment instructions will be provided upon registration.**

Registration

Name

Surname

Position

Organization

VAT/C.F.

Address

Postal Code

City

Country

Phone/Fax

Participant e-mail

Billing e-mail

PLEASE RETURN BY FAX OR E-MAIL

Instruments Demonstration

Course attendees are invited to visit the free demonstration offered by **IESMAT, S.A. (www.iesmat.com)**.

Instruments demonstration will take place in a location next to course class room, from 16:00 to 19:00, October 2 and 3. Instrumentation can be also viewed during coffee and lunch breaks.

Participants will be able to observe practical experiments on advanced equipment for Particles Size and Shape characterization, Z-Potential, Rheology characterization, and Concentrated Liquid Dispersions Stability characterization.

Participants may bring their own samples if they wish to conduct tests on the instruments available during the demonstration.

General information

Cancellations received after September 14th 2012 will be invoiced completely.

All cancellations will be subject to Euro 200 processing fee. Substitutions may be made at any time. Payment is due once the participant receives an invoice. Certificates will be issued to participants upon completion of the course.

For Information please contact us at:

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