Statistical Design Space Development for Pharma – from Design of Experiment to Granules “Master of Solids” Certification Seminar
October 07 to 08, 2015

www.boschpackaging.com/academy

Your successful management through individual, specific knowledge!
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00–8:15</td>
<td>Registration</td>
</tr>
<tr>
<td>8.15–9.15</td>
<td><strong>Introduction, DoE Basics and Regulatory framework</strong> – Dr. S. Politis, Genepharm</td>
</tr>
<tr>
<td></td>
<td>A short overview of the basic DoE Techniques with actual pharmaceutical applications will be</td>
</tr>
<tr>
<td></td>
<td>combined with an overview about regulatory framework governing Quality by Design, Process</td>
</tr>
<tr>
<td></td>
<td>Analytical Technology and Continuous Process Verification. Focus is given on practical</td>
</tr>
<tr>
<td></td>
<td>projections to formulation and process development aimed at risk mitigation during product</td>
</tr>
<tr>
<td></td>
<td>realization.</td>
</tr>
<tr>
<td>9.15–10.00</td>
<td>**Risk Analysis: Selection of process factors (CPPs) and product properties for granules</td>
</tr>
<tr>
<td></td>
<td>(CQAs)** – Dr. M. Michaelis, Hüttlin/Bosch</td>
</tr>
<tr>
<td></td>
<td>For a reliable DoE a basic knowledge about the process is mandatory. An overview about the</td>
</tr>
<tr>
<td></td>
<td>fluid bed granulation is given under application of FMEA (Failure Mode and Effects Analysis).</td>
</tr>
<tr>
<td>10.00–10.15</td>
<td>Coffee Break</td>
</tr>
<tr>
<td>10.15–11.15</td>
<td><strong>From full factorial to optimization designs</strong> – Dr. E. Johansson, MKS Umetrics</td>
</tr>
<tr>
<td></td>
<td>Full factorial designs are the basis for DoE. RSM designs are used for Design Space and</td>
</tr>
<tr>
<td></td>
<td>optimization.</td>
</tr>
<tr>
<td>11.15–12.15</td>
<td><strong>Creation of a DoE for the case study; Reworking the FMEA into a practical design (DoE)</strong> – All</td>
</tr>
<tr>
<td></td>
<td>Bringing theory into practice, the information gained during the morning session should now</td>
</tr>
<tr>
<td></td>
<td>be transferred into a DoE. “The participants will create their own DoE case study with the</td>
</tr>
<tr>
<td></td>
<td>MODDE software”.</td>
</tr>
<tr>
<td>12.15–13.15</td>
<td>Lunch Break</td>
</tr>
<tr>
<td>13.15–16.15</td>
<td><strong>Practical experiments on the fluid bed</strong> – All</td>
</tr>
<tr>
<td></td>
<td>The participants will be divided into several groups. Every group will run a part of the</td>
</tr>
<tr>
<td></td>
<td>DoE on a laboratory fluid bed granulator.</td>
</tr>
<tr>
<td>16.15–16.30</td>
<td>Coffee Break</td>
</tr>
<tr>
<td>16.30–18.00</td>
<td><strong>Analyzing the granules</strong> – All</td>
</tr>
<tr>
<td></td>
<td>The characteristics of the granules will be used as response variables for the evaluation</td>
</tr>
<tr>
<td></td>
<td>of the DoE. The groups will analyze their produced granules.</td>
</tr>
<tr>
<td>18.00</td>
<td><strong>Transfer to hotel and later on pickup for dinner</strong></td>
</tr>
</tbody>
</table>
Objective of the seminar
The target of this seminar is to combine the theory of DoE (statistical and mathematical aspects) with a practical workshop (production of granules). We combine theoretical knowledge with data from real granulation trials. As a result of this seminar the participant will feel confident in things such as QbD, Design Space, Six Sigma and Capability – quality systems for their operation improvements.

Who should attend?
Professionals engaged in the development or production of solid dosage forms with user knowledge of MKS Umetrics’ MODDE®-Software.

Please note
As the course requires user knowledge of MKS Umetrics’ MODDE®- Software, we recommend to visit the pre-running MKS Umetrics-Modde-Training course from October 05–06, 2015 at our site.

To install MKS Umetrics’ MODDE®- Demo-Software version a laptop with administrator rights is required.

Agenda | Day Two: October 08, 2015
---|---
9.00–10.00 | Risk Management as a useful tool in designing oral solid dosage forms – Industrial Perspective
Dr. E. Hamed, Cubist/Merck
Real life implementations of quality by Design tools in the selection of formulation components and the design of manufacturing process for oral solid dosage forms.

10.00–10.15 | Coffee Break

10.15–11.15 | Introduction into MVDA (Multivariate Data Analysis) – Dr. E. Johansson, MKS Umetrics
A start towards on-line monitoring and CPV (Continuous Process Verification).

11.15–12.15 | Evaluation of raw data from case study – Dr. E. Johansson, MKS Umetrics
The participants will get a demonstration about the evaluation of the raw data from day one.

12.15–13.15 | Lunch Break

13.15–14.45 | Statistical Design Space Development I – All
From the results of the case study the participants will develop the Statistical Design Space. The results will be presented and discussed in context with the results from the raw data evaluation.

14.45–15.00 | Coffee Break

15.00–16.30 | Statistical Design Space Development II – All
From the results of the case study the participants will develop the Statistical Design Space. The results will be presented and discussed in context with the results from the raw data evaluation.

16.30–17.00 | Wrap Up & final discussion – All

17.00 | End of seminar
Statistical Design Space Development for Pharma – from Design of Experiment to Granules “Master of Solids” Certification Seminar

How to get the maximum knowledge out of your process with the minimum effort? Design of Experiment (DoE) is a structured, organized and effective method for determining complex relationships between multi-dimensional factors that may impact a process.

The first day will cover the fundamentals of DoE including mathematical and statistical analysis along with an in-depth introduction to full factorial designs. Granulation trials following a DoE plan will be analyzed with the state-of-the-art software package MKS Umetrics’ MODDE®.

The second day will be focussed on the analysis of the granulation trials and development of corrective actions. The power of using DoE combined with Analysis of Variance (ANOVA) as the Six Sigma’s “power tool” will lead to cost effective manufacturing principles.

Trainings and Seminars

▶ “Specialist of Operation” (1 credit per seminar)
▶ “Expert of Solids” (2 credits per seminar)
▶ “Master of Solids” (3 credits per seminar)
One Step Ahead!
Your individual way to your “Master of Solids” certification: Combine your existing expert experience with a wisely selected combination of our Bosch Solid Seminars and bring your knowledge to the next level.

Leadership through knowledge
▶ We will take you up where you are.
▶ If you need a “hands on training” of the equipment for operators or if you want a deep process understanding for scientists.
▶ We support you to become a leader through knowledge.

Enhance your knowledge and successfully become a “Master” or “Expert” of Solids or a “Specialist of Operation”
▶ With our Master, Expert and Equipment Specialist courses, theoretical and practical training is given to provide you with the necessary skill set and to give you an understanding to enhance your daily work as well as to successfully achieve your goals.
▶ Credits are collected along with each course and are accumulated to become a “Specialist of Operation” (3 credits from our equipment specialist training courses), an “Expert of Solids” (8 credits from either Expert and/or Master training courses) and finally a “Master of Solids” (13 credits from both Expert and Master training courses).
▶ Each Equipment Specialist course is worth 1 credit, each Expert course is worth 2 credits and each Master course is worth 3 credits.

Our seminars combine to provide you with an extensive knowledge and understanding through pharmaceutical development to production within a number of specific fields.

Individual modules can be selected via the cube, which are scheduled at our various sites around Europe.
Your speakers

Dr. Erik Johansson, MKS Umetrics, Sweden
Erik Johansson is the senior application specialist of MKS Umetrics. He has a long and broad experience from using DoE and MVDA in the Pharma and Biotech industries. After graduating in 1984 from the University of Illinois and Umea University, in 1985 Dr. Johansson joined AstraHässle (today part of AstraZeneca) on a specialist mission to focus on QSAR and PAT. After six years with AstraHässle, Dr. Johansson was recruited by MKS Umetrics as a senior application specialist. In this role, he has provided consulting expertise to clients such as AstraZeneca, GSK, Novartis, Pfizer and Roche. Erik Johansson is a frequently engaged external lecturer and has conducted training classes on DoE/MVDA for MPA, EMEA and EUFEPS. Currently his focus is on helping Pharma and Biotech companies to fulfill the objectives of Design Space estimation under the Quality by Design (QbD) umbrella.

Dr. Marc Michaelis, Hüttlin/Bosch, Germany
Marc Michaelis is a pharmacist and graduated from University of Hamburg/Germany. After a six months research Internship at University of Florida/USA he worked as a researcher at University of Hamburg, where he used DoE as a tool for measurement system analysis and formulation development. He joined in 2013 Hüttlin/Bosch as a Senior Pharmaceutical Technology Scientist and is also responsible for HSE affairs, improvement of laboratory structures and procedures.

Dr. Stavros Politis, Genepharm, Greece
Stavros Politis is a pharmacist with post-graduate studies in Pharmaceutical Technology at University of Athens, obtaining a PhD on the study of a rotogranulation process via DoE techniques. He is co-founder of i-QbD.com and co-author of a book on the theory and practical implementation of TQM. He has more than 13 years of experience in the field of dosage form design, the vast majority performed applying the QbD toolbox. He is Head of Formulation Development at Genepharm SA, Greece.

Dr. Ehab Hamed, Cubist Pharmaceuticals/Merck, USA
Ehab Hamed is the Director of Drug Product Technology at Cubist Pharmaceuticals/Merck, USA. Previously, Dr. Hamed held several positions of increasing responsibilities in R&D functions at CIMA LABS, Cephalon and Teva where his latest role was Director of Formulations Department. During his industrial tenure, Dr. Hamed led several groups in developing and securing regulatory approval for multiple oral and parenteral drug products. He is a pharmacist by training and holds a Ph.D. degree in Industrial Pharmacy from the University of Cincinnati, USA.

Announcement of MKS Umetrics-Modde-Training “Quality by Design and Design Space”
October 05–06, 2015 at Hüttlin/Bosch:

Scientific investigations involve changing a number of controlled variables to direct the response in question towards a desired level. Design of Experiments (DoE) is a rational and cost-effective approach to practical experimentation that allows the effect of variables to be assessed using only the minimum of resources. The course is composed of lectures, demonstrations and computer excises in software MODDE® based on real life investigations.

Course objectives:
▸ Create efficient experimental designs to match the objectives
▸ Analyze experimental data using sound statistical principles
▸ Improve and optimize products and processes
▸ Interpret the results to increase understanding
▸ Make a risk estimate of the decided settings
▸ Set specifications for normal operations (Design Space)
▸ Report results in a simple graphical format

If you book both seminars (this seminar AND Hüttlin DoE-Seminar) you will get 30% discount on each course.

Your contact at MKS Umetrics: Mrs. Marie Wensley, Phone: 0046 40 6642594, Email: umetrics.academy@umetrics.com
Registration Form

Statistical Design Space Development for Pharma – From DoE to Granules
“Master of Solids” Certification Seminar
October 07 to 08, 2015 in Schopfheim (Germany)

Please register for the seminar by e-mail to monika.foehner@bosch.com

<table>
<thead>
<tr>
<th>Company name</th>
<th>Your Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surname</td>
<td>First Name</td>
</tr>
<tr>
<td>Position</td>
<td>Department</td>
</tr>
<tr>
<td>Billing address</td>
<td>VAT Nr. of Company</td>
</tr>
<tr>
<td>Postcode</td>
<td>City, Country</td>
</tr>
<tr>
<td>Company address</td>
<td>Fax</td>
</tr>
<tr>
<td>Postcode</td>
<td>City, Country</td>
</tr>
<tr>
<td>Direct E-mail</td>
<td>Direct Phone</td>
</tr>
</tbody>
</table>

Date, Signature

The reservations are limited to ensure a hands-on training for every participant.
Registration deadline: September 28, 2015

Price for Seminar
1250€ (excl. VAT), 10% reduction for participants from a previous course (Inclusive: lunches and beverages during the seminar and dinner on the first and second day). As soon as we receive your registration form we will send an order confirmation to you with our banking details and more detailed information on the seminar.

Terms of Payment
Payable in full within 10 days from date of invoice.

Please note
This is a mandatory registration. The payment is not confirmed from Hüttlin. The organizer reserves the right to change speakers and topics.

Cancellation Policy
For written cancellations received up to 2 weeks prior to the seminar date, 20% of the registration fees are due. For cancellations received up to 1 week prior to the seminar date, 50% of the registration fees are due. For cancellations within 1 week prior to the seminar date, 100% of the registration fees are due. In the case of a non-appearance at the event without prior notification, the full course fees will be invoiced. A substitute participant is of course always welcome at no extra charge. Should it be necessary to cancel the seminar from our side, a full refund will be given.

Your Contact Person
Dr. Marcus Knöll
Head of Engineering Pharma Service

Seminar Coordination
Monika Föhner
Phone +49 7622 6884-128
monika.foehner@bosch.com
Statistical Design Space Development for Pharma

“Master of Solids” Certification Seminar