SCIENTIFIC UPDATE

*We've got chemistry*

3 day Course

2020

# THE DESIGN, DEVELOPMENT AND SCALE-UP OF SAFE CHEMICAL PROCESSES AND OPERATIONS

## Principles and Practice

"It is very useful to chemists and chemical engineers to do their jobs safely."
**Cambrex**

In collaboration with:

DEKRA

# THE DESIGN, DEVELOPMENT AND SCALE-UP OF SAFE CHEMICAL PROCESSES AND OPERATIONS

A 3 day course


## INTRODUCTION

**Developing safe processes is of paramount importance to any chemical company. Exothermic chemical reactions in batch and semi- batch processes can result in serious injury to people and plant if they get out of control. Results of thermal runaways include violent loss of containment, possibly explosion and the release of flammable or toxic materials to the environment.**

Employers are bound by Health & Safety legislation to ensure the safety of their employees and those outside their employment who might be affected by their activities. Chemical manufacturers must therefore be aware of all potential dangers in their processes and take steps to eliminate them. The best approach is to design safety into the process from the start.

Often, the first sign of loss of control over a reaction is a reduction in yield or in the quality of the product. Thus safety, quality and profitability are all interlinked.

This seminar is designed to enhance the awareness of chemists and engineers regarding hazard issues. Utilizing the expertise of the chemists and chemical engineers at DEKRA Process Safety and Scientific Update, it will consider hazard control of new chemical processes throughout their development cycle: from early development through to full-scale production. Hazards can often be eliminated by appropriate choice of reagent or synthetic route at the R&D stage. Where this is not possible, techniques exist to quantify the hazards so that robust engineering solutions can he applied in production.

## COURSE OUTLINE

**Day 1**

- The Process Lifecycle
- Where hazards arise – a review of reported incidents involving runaway reactions and current legislation
- Techniques for safe process design and optimization
- Chemical hazards assessment strategy
- Fundamental principles of scale-up and reaction runaway
- Workshop problems
- Identification of highly energetic materials
- Small scale screening tests for liquids, mixtures and powders
- Reaction characterization through calorimetry

**Day 2**

- Characterization of runaway reactions using adiabatic calorimetry
- Case studies
- Flammability issues associated with chemical manufacture (including a brief discussion of electrostatic hazards)
- Tour of DEKRA Process Safety Laboratories

**Day 3**

- Selection of Safety Measures and Case Study
- Emergency relief venting methodology
- Relief system case studies
- Relying on Process Control for Safety (safety critical systems, IEC61508/11)

DEKRA

## IN-HOUSE COURSE

For 8+ people contact us to discuss holding this event In-House - **sciup@scientificupdate.com**

## WHO SHOULD ATTEND

Process R&D Chemists, Production Chemists, Chemical Engineers and anyone whose responsibilities include safety or risk assessment of chemical processes or building safety into chemical process scale-up.

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**Registration** 8.30
**Course commences** 9.00 Day 1
**Course adjourns** 4.00 on Day 3

**Course fees include a comprehensive course manual, refreshments throughout each day, lunches and one course dinner on the first evening**

For all prices and dates please refer to our website

IT'S EASY TO REGISTER ONLINE

## COURSE TUTORS

**Mr Keith Middle**

**Dr Stephen Rowe**

**Dr Will Watson**

*You can find the full tutor biographies on our website, tutors will depend on location.*

## COURSE OBJECTIVES

> To train chemists and engineers in efficient methods for developing safe, low cost, robust processes for the manufacturer of fine organic chemicals in the minimum amount of time

> To improve the awareness of chemists on the principles of scale-up and development, in chemical engineering concepts relating to safe plant operation and in the latest techniques for the optimization of processes

> To learn from the experience (and mistakes) of others by examining case studies from industry

## WHAT WILL ATTENDEES GAIN FROM THE COURSE?

> The ability to identify any significant sources of hazard in existing processes or development plans

> An understanding of the latest techniques for assessing risk, and measuring and quantifying chemical process hazards in the work place

> An understanding of the established best practice to reduce the hazard resulting from exothermic reaction systems with a particular emphasis on emergency relief design

## REGISTRATION

Use our **fast online booking system by visiting www.scientificupdate.com**

Alternatively you can mail or fax the attached registration form to:
Scientific Update
Maycroft Place, Stone Cross,
Mayfield, East Sussex, TN20 6EW, UK
Fax Number +44 1435 872734

**How to Pay**

When you register online, you can have the option to pay via credit card (Amex, MasterCard or Visa). A receipted invoice will be automatically generated once paid and sent via email. Should your company wish to pay by cheque or bank transfer, on booking, bank details will be supplied with an invoice.

**Group Discounts**

Group discounts are available on two or more attendees - see registration form. This offer only applies if bookings are made simultaneously and from the same billing address.

**Confirmation of your registration**

These will be sent via email.

**Late Applications**

For late applications, please register online or fax the completed registration form, including credit card payment information.

**Cancellations/Refunds**

Should you be unable to attend and cancel in writing no later than 1 month before the start of the course, Scientific Update will refund your registration less £300.00 (or equivalent in €/$) processing fee. Unfortunately refunds are not possible after that date. Substitutions can be made at any time.

**DON'T MISS OUT - REGISTER TODAY**

**EVENT:**

**DATES:** **LOCATION:**

**No. of attendees** **Price**

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First name
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*payments via Amex can only be made in US dollars

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If you select to pay in a different currency than the event is advertised in, the amount charged will be based on the exchange rate at the time of preparing the invoice.

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Complete the details for either two or three delegates and your discount will automatically be applied. This offer only applies where all delegates are booked simultaneously and at the same billing address.

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For full terms of business and payment details please see our website

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