

Scientific Update | Training Courses 2010



# The Design, Development and Scale-Up of Safe Chemical Processes and Operations

Principles and Practice



A 3 day seminar  
for chemists and  
engineers given by

**Chilworth**  
GLOBAL  
The Experts in Process Safety



25 - 27 May 2010

The Winchester Hotel

Winchester, Hampshire, UK

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# The Design, Development and Scale-Up of Safe Chemical Processes and Operations Principles and Practice

25 - 27 May 2010 | The Winchester Hotel, Winchester, Hampshire, UK

## General Information

The seminar begins with registration at 8:30am on Tuesday 25 May, with the course commencing at 9.00am and finishes at approximately 4.00pm on Thursday 27 May.

The organisers reserve the right to change the published programme of events and course content as circumstances dictate.

## Fee

£1521.63 (inc VAT @ 17.5%) including lunch & refreshments, the course dinner on 25 May and comprehensive course manual.

## 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. Utilising the expertise of the chemists and chemical engineers at Chilworth Global 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 be applied in production.

## Programme

### Tuesday 25 May

08:30 Registration  
 09:00 Introduction  
 09:05 The Process Lifecycle  
 09:45 Where hazards arise – a review of reported incidents involving runaway reactions and current legislation  
**10:30 Break**  
 11:00 Techniques for safe process design and optimization  
**12:30 Lunch**  
 13:30 Chemical hazards assessment strategy  
 14:15 Fundamental principles of scale-up and reaction runaway  
 14:45 Workshop problems  
**15:15 Break**  
 15:45 Identification of highly energetic materials  
 16:15 Small scale screening tests for liquids, mixtures and powders  
 16:45 Reaction characterization through calorimetry  
 17:15 Discussion and Close of Day 1  
**19:30 Dinner**

### Wednesday 26 May

09:00 Reprise of Day 1  
 09:10 Characterization of runaway reactions using adiabatic calorimetry  
 09:40 Case studies  
**10:15 Break**  
 10:35 Flammability issues associated with chemical manufacture (including a brief discussion of electrostatic hazards)  
**12:30 Lunch**  
 13:30 Depart for tour of Chilworth Global Laboratories  
 16:45 Depart Chilworth

### Thursday 27 May

09:00 Reprise of Day 2  
 09:10 Selection of Safety Measures & Case Study  
**10:15 Break**  
 10:45 Emergency relief venting methodology  
**12:30 Lunch**  
 13:30 Emergency relief venting methodology - continued  
 14:00 Relief system case studies  
**14:45 Break**  
 15:15 Process control considerations (safety critical systems, Safety Instrumented Systems, ISA S84.01/IEC 61508/11, equipment reliability and maintenance)  
 15:50 Summary and conclusions  
**16:00 Finish**

“Excellent course.”  
GSK

## Chilworth Global

Chilworth Global is an independent company specialising in process safety. They provide a range of services to help industry reduce the risk of hazards in their processes, including consulting advice, incident investigation, laboratory testing, contract research and development and the provision of training courses. Their consulting engineers have practical experience in industry to complement their expertise in process safety.

Chilworth Global has a worldwide client base, with experience helping many leading manufacturers in the chemical and processing industries. The company has its headquarters at Southampton in the UK with other facilities in USA (Princeton, New Jersey), Italy (Milan), France (Lyon), Spain (Valencia), Netherlands, Ireland and India (Delhi, Mumbai and Chennai).

Their senior consulting staff are internationally recognised experts in their fields, who serve on international standards committees and frequently lecture at conferences and seminars.

For further information telephone +44 (0) 23 8076 0722 or email [info@chilworth.co.uk](mailto:info@chilworth.co.uk)

## Tutors

### Chilworth Global

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Full Tutor Biographies can be found on our website at [www.scientificupdate.co.uk/training/course-tutors](http://www.scientificupdate.co.uk/training/course-tutors)

## Venue



The Winchester Hotel  
Worthy Lane  
Winchester  
Hampshire SO23 7AB, UK  
Tel: +44 1962 709988 [www.pedersenhotels.com/winchester](http://www.pedersenhotels.com/winchester)

The hotel is located in the heart of the ancient city of Winchester. The nearest Airport is at Southampton International, which is 11 miles away. Alternatively, Heathrow Airport is 57 miles away. Taxis from Heathrow will cost approximately £72, and approximately £28 from Southampton airport. National Express coach service from Heathrow to Winchester costs approximately £25 for a return journey (and the hotel is situated in very close proximity to the main coach station). Winchester main line station is less than 5 minutes walk away from the hotel.

A limited number of rooms have been reserved at the hotel at the special rate of £105 per night including breakfast and VAT. VAT rate will be increased to 17.5% from 1 January 2010. Further information about reserving your room will be sent to you when you register.

## Who Should Attend?

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

## Seminar Objectives

**To train chemists and engineers** in efficient methods for developing safe, low cost, robust chemical processes 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 optimisation of processes

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

## What you will leave with ...

**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

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**For late applications** please register on line at [www.scientificupdate.co.uk](http://www.scientificupdate.co.uk) or fax the completed registration form, including credit card payment information.

**Venue/Accommodation** You will be sent details of how to reserve your accommodation with your event confirmation details.

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