

Chilworth Technology

A Professional Process Safety Firm

FIRE, EXPLOSION & THERMAL HAZARDS TRAINING COURSES

PLAINSBORO, NJ

Chilworth Technology, Inc.
250 Plainsboro Rd, Bldg #7
Plainsboro, NJ 08536
(609) 799-4449 (Tel)
(609) 799-5559 (Fax)
March 10-14, 2008

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250 Plainsboro Rd, Bldg #7
Plainsboro, NJ 08536
(609) 799-4449 (Tel)
(609) 799-5559 (Fax)
May 12-16, 2008

LAS VEGAS, NV

Hampton Inn Tropicana
4975 Dean Martin Drive
(702) 948-8100
October 20-24, 2008

When making hotel reservations, please
instruct that you are with the Chilworth
Technology Group to receive group rates.



Courses are from 9 AM to 4 PM with continental breakfast starting at 8:30 AM daily.

Monday

- ❖ **Understanding & Controlling Electrostatic Hazards**

Tuesday

- ❖ **Dust Explosion Prevention & Protection Techniques**

Wednesday

- ❖ **Gas/Vapor Explosion Hazards**

Thursday

- ❖ **Evaluation and Selection of Electrical and Non-Electrical Equipment for use in Hazardous Areas**

Friday

- ❖ **Chemical Reaction Hazards**

Monday - Understanding & Controlling Electrostatic Hazards

COURSE DESIGN AND OBJECTIVES

This course will explain how and where electrostatic charge is generated, how to diagnose static problems and how to find solutions. Practical static control techniques are presented by considering case histories of explosion incidents investigated by Chilworth Technology consultants.

Upon its completion, attendees will have gained an understanding of how electrostatic charge is generated in industrial environments. They will be able to recognize those electrostatic hazards that can trigger industrial fires and explosions, and will have an awareness of how to control electrostatic charge in order to reduce or eliminate such risks.

COURSE CONTENTS

Introduction to Electrostatics

- Background information and definitions,

Electrostatic Discharges

Four types of "Discharges" – Evaluation of each in terms of their incendiarity in gas, vapor, aerosol and dust cloud flammable atmospheres

Electrostatic Hazards Evaluation

A systematic approach to the diagnosis of electrostatic problems and hazards

- ◆ People and Facilities
- ◆ Powder Handling
- ◆ Liquid-Vapor Handling
- ◆ Use of Plastics

Video Presentation

Q&A/Group Discussion



Tuesday - Dust Explosion Prevention & Protection Techniques (including Dust Hazard Codes & Standards)

COURSE DESIGN AND OBJECTIVES

This course presents the techniques available for both preventing dust explosions and protecting people and facilities from their effects. It presents a systematic approach to dust explosion hazard assessment directed towards obtaining a Basis of Safety for a process. Upon completion of the course, participants will have gained an understanding of the serious consequences of dust explosions, the conditions under which they can occur, how to prevent dust explosions, and precautions for protection of people and facilities from the effects of an explosion. They will also understand the role of Codes and Standards in managing risk as well as the need for dust hazard properties.

COURSE CONTENTS

Introduction

- Basic Theory and Definitions

Dust Hazard Codes & Standards

- OSHA's & EPA's "General Duty" clauses
- OSHA Instructions on Combustible Dust – National Emphasis Program
- U.S. and Int'l Fire, Mechanical & Building Codes
- NFPA and other Recommended Practices

Flammability Assessment

- Ignition Sensitivity
- Explosion Severity
- Burning Properties

Conditions Affecting Flammability

- Temperature
- Oxidant

Dust Explosion Hazard Control

- Avoiding Ignition Sources
- Avoiding Flammable Concentrations
- Avoiding Oxidant

Explosion Protection Techniques

- Relief Venting
- Suppression
- Containment
- Isolation

Video Presentation

Q&A/Group Discussion

Wednesday – Gas/Vapor Explosion Hazards

COURSE DESIGN AND OBJECTIVES

This course has been designed to assist engineers and process safety personnel who are involved with chemical processes and operations where flammable gases, vapors, or mists are present. Practical prevention techniques are presented along with case studies and the theoretical knowledge necessary to gain a complete understanding of the subject.

Upon completion of the course, participants will be well versed in the flammability attributes of gas, vapor and mist atmospheres. Gaining new insight into their existing and future processes, they will be qualified to define a Basis of Safety for their operations.

COURSE CONTENTS

Introduction to Flammable Atmospheres

Basic theory and definitions

Flammability of Vapors, Gases and Mists

Flash points, Flammable Ranges, Explosion Severity, Autoignition Temperatures

Conditions Affecting Flammability

Temperature, Pressure, Oxidant, Mixtures

Establishing A Basis of Safety

- Avoiding Ignition Sources
 - Static Electricity, Friction, Impact, Electrical Equipment
- Avoiding Flammable Concentrations
 - Ventilation, Temperature Control
- Avoiding Oxidant
 - Inert Gas Blanketing

Q&A/Group Discussion



THE COURSES

An essential part of safe manufacturing is the evaluation of processes and plant to identify sources of hazard and to prescribe practical safety measures. To do this effectively requires a technical understanding of process safety and the practical experience of implementing safety measures in plant.

The international safety consulting group, Chilworth Technology, has put together a series of training courses which have been designed to show how both operational and chemical hazards in manufacturing processes can be systematically identified and assessed, and how the most appropriate basis of safety is selected and implemented.

WHO SHOULD ATTEND

Courses are suitable for staff from the chemical & processing industries, including bulk & finished pharmaceuticals, bulk & fine chemicals, detergents & soaps, petrochemicals, food & drink, plastic & rubbers, metals, textiles, paper & lumber, agrochemicals, and dyes & paints.

Thursday -

Evaluation and Selection of Electrical and Non-Electrical Equipment for use in Hazardous Areas

COURSE DESIGN AND OBJECTIVES

Incorrectly specified electrical and mechanical equipment can provide a significant source of ignition for flammable atmospheres. The hazardous area classification process is designed to identify locations within a process plant where ignitable atmospheres exist, and to determine their likely extent. Using this information, the risk of ignition from equipment and devices in the areas can be minimized by either the specification of suitable equipment/devices, or relocating them to a safe non-hazardous area.

Upon completion of this course, attendees will have gained an understanding of the regulatory requirements of codes and standards for the classification of hazardous areas, the hazards of fires and explosions, and how to perform a hazardous area classification study. The course covers the classification of areas where flammable atmospheres can arise from the presence of combustible dusts, or flammable gases, and vapors, and ignition hazards that could be created by electrical and non-electrical equipment and devices.

COURSE CONTENTS

Introduction

- Overview of Regulatory Requirements
- Relevant Codes, Standards, and Guidelines – NFPA, EN, ATEX, etc.
- Introduction to Fire and Explosion Hazards
- Flammability Characteristics relevant to Ignition Sensitivity and Hazardous Area Classification

Methodology for Hazardous Area Classification

- Identification of Hazardous (Classified) Areas or Zones
- North American and International Hazardous Area Designation
- Classifying and Determining the Extent of Areas Containing Flammable Gases, Vapors, and Dusts
- Effects of Ventilation, Temperature, and Pressure on the Extent of Zones

Assessment of Non-Electrical Equipment and components intended for use in ignitable atmospheres

- Ignition Hazards associated with Non-electrical Equipment and Devices
- Methodology of the Assessment

Selection of the Electrical Equipment for Hazardous Areas

- Methods of Protection and summary of commonly used protection methods for different Divisions & Zones
- Ingress Protection: IP Codes. NEMA and UL Types of Enclosures
- Intrinsic Safety

Workshops

Q&A/Group Discussion

Friday -

Chemical Reaction Hazards

COURSE DESIGN AND OBJECTIVES

The risk analysis of reactive systems is an essential tool to ensure safety prior to process operations. Reaction study provides an insight into the complex interaction of a wide range of factors that influence the probability and consequences of undesired safety incidents involving chemical reaction, energies, equipment, personnel and productivity. This course illustrates the use of Chemical Engineering Principles to the study of potential runaway reactions for storage and reactor risk assessments. Inherently safer processes can be best developed from an understanding of chemical reactivity and small-scale studies.

The goal of the course is to guide those who perform risk analysis of chemical processes in their task, to help them understand the thermal aspects of processes, and to develop a common and easily understandable language between specialists and non-specialists.

Problem solving sessions are included throughout the course. The course is designed with the expectation that problems will be used to amplify and extend the material. It has been our teaching experience that these workshops are an essential part of the learning process.

COURSE CONTENTS

Introduction

Case Histories

Assessment of the Thermal Safety of Chemical Processes

- Thermal Risks and Systematic Assessment
- Desired and Undesired Reactions
- Technical Tools for Measurement and its Principles

Auto Catalytic Reactions

- Understanding
- Evaluations

Inherently Safe Process

- Safe Process
- Integrating Safety Considerations into Process Design

Heat Accumulation Situations

- Unstirred and Stirred Masses
- Thermal and Practical Consequences

Problem Solving Sessions

Video Presentation

Q&A/Group Discussion

* It is suggested to bring a scientific calculator to this course.

-About the Company -

Chilworth Technology is an international group of companies providing specialist services to industry in process safety. These services include the provision of independent consulting advice, laboratory testing, in-plant training, incident investigation and expert evidence.

The group has both consulting bases and extensive laboratory testing facilities in the USA (New Jersey) and in Europe (United Kingdom). Laboratory facilities include state of the art dust explosion laboratory, electrostatics laboratory (with low humidity facility) and specialist laboratories for chemical reaction testing and the evaluation of thermal runaway reactions.

Most of Chilworth's senior staff serve on US and European guidelines and standards committees and hold professional institution memberships.

-About the Speakers-

Dehong Kong, Ph.D., PE, CSP, is the Flammability Group Manager and a Sr. Process Safety Specialist for Chilworth Technology, Inc. He applies his expertise in the fields of fire and explosion hazards and turbulent combustion to the process safety auditing, testing, investigation and process analysis services of the company. Dr. Kong joined Chilworth after being with Christian Michelsen Research, where he conducted extensive work in dust and gas explosions and turbulent combustion, which formed the basis of his Ph.D. He has a B.Sc. degree in Metallurgical Engineering and a M.Sc. degree in Physicochemistry and Dust Explosions from the North-Eastern University, and a Ph.D. in gas explosions (Process Safety, Applied Physics) from the University of Bergen.

Richard Kwasny, Ph.D., is the Asst. Director of the Chemical Process Evaluation Group at Chilworth and is a recognized specialist in the area of chemical reactivity and process safety. His experience spans more than 25 years in pharmaceutical and chemical industry. His expertise encompasses all areas of chemical reaction hazards and flammability (dust, vapors and gases) including analytical tools, process scale-up, technology transfer, process hazard assessment (PHA), and process safety management (PSM). He has comprehensive knowledge of safety standards and regulations at the federal and state level including OSHA and NJ-TCPA. He is an expert in incident investigation and causal analysis. He is a member of ASTM Committee E27 on Hazard Potential of Chemicals. He received his Ph.D. degree in chemical engineering from South Bank University (University of London).

Vahid Ebadat, Ph.D., M.Inst.P., MIEE, C.Eng., C.Phys. is the CEO of Chilworth Technology, Inc. He has worked extensively as a process and operational hazards consultant for the chemical, pharmaceutical and food industries. Dr. Ebadat is a regular speaker at training courses on gas and vapor flammability, dust explosions, and controlling electrostatic hazards. He is a member of NFPA 77 Technical Committee on Static Electricity, NFPA 654 Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particular Solids and ASTM E27 Committee on Hazard Potential of Chemicals. Dr. Ebadat's research has culminated in the publication of numerous technical papers and articles.

David E. Kaelin, Sr., B.S.Ch.E., Mr. Kaelin has over 25 years experience in the specialty chemical manufacturing industry and 15 years specializing as a Process Safety Engineer. He has participated in the design and construction of numerous chemical processing facilities and provided support and training in all areas of PSM. As a Process Safety Engineer he has led process hazard analysis, risk assessments and facility siting reviews. At the corporate level he has created and taught courses in PSM and hazard recognition methods. Mr. Kaelin is an active member of AIChE, and NFPA.

-Registration Form-

Process Safety Courses in

___ Plainsboro, NJ - March 10-14, 2008

___ Plainsboro, NJ - May 12-16, 2008

___ Las Vegas, NV - Oct. 20-24, 2008

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____ Fax _____

Email _____

Monday

Understanding & Controlling Electrostatic Hazards

Tuesday

Dust Explosion Prevention & Protection
Techniques (including Dust Hazard Codes & Standards)

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Gas/Vapor Explosion Hazards

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Evaluation and Selection of Electrical and Non-
Electrical Equipment for use in Hazardous Areas

Friday

Chemical Reaction Hazards

One Course.....\$495

Three Courses.....\$1395

Five Courses.....\$1995

All course fees must be received before the course commences. We accept Visa, Mastercard, Amex or company checks. Course fees include continental breakfast, lunch and course notes. For special group rates call 609-799-4449.

Fax this registration form and your P.O. to:

Chilworth Technology, Inc.

250 Plainsboro Rd, Bldg #7

Plainsboro, NJ 08536

ATTN: Victoria R. Jones

Phone: 609-799-4449 - Fax: 609-799-5559

Email: safety@chilworth.com

<http://www.chilworth.com>

Cancellation Policy

Absolutely NO refunds will be made if cancellations are made within 30 days prior to course date; a possible credit may be arranged. Chilworth reserves the right to make last minute changes and/or cancellations.

Course Location

Hotel Reservations must be made directly with each hotel. The cost of accommodations is NOT included in the course fee. *Hotel parking fees may apply. We strongly recommend making reservations as early as possible since the Hotels will only keep the Chilworth Group Block of rooms until 30 days prior to the course start date; after 30 days our group rates no longer apply and reservations are on a first come, first serve basis.*

Can't Make it to the course?

Chilworth Technology also offers in-company training courses. The contents and the duration of the in-company courses can be tailored to meet your specific requirements. In addition to the courses offered in this brochure, we can present in-company training courses to cover the following:

❖ Dust Explosion Hazards

This course includes discussion of potential ignition sources, dust explosion tests and their applications, latest guidelines on explosion prevention and protection methods, case histories, video presentation and demonstrations.

❖ Industrial Electrostatic Hazards

This course addresses the various types of electrostatic discharges and their expected energies, describes a systematic approach for identifying and controlling electrostatic hazards during powder and liquid handling operations, and includes case histories and hands on demonstrations.

❖ Managing Flammable Atmospheres

This course shows how potential gas and vapor flammability hazards can be systematically identified. It describes relevant tests and their interpretation according to current standards. Other features include a guide to selecting preventative measures, case histories and video presentation.

❖ Chemical Reaction Hazards

This course discusses the identification of potential exothermic reaction hazards, effective strategies for their control, and methods for protecting from their effects. The course includes practical workshops, case histories, and video presentation.

For further information or to discuss your specific needs for an in-company training course, please contact us at (609) 799-4449.