



The Global Experts in Explosion & Process Safety  
Your partner for developing proficiency programs

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## Competence Development & Training in Process Safety 2017

[www.dekra-insight.com](http://www.dekra-insight.com)

SCIENCE AT THE HEART OF SAFETY

DEKRA Insight represents the collective expertise of our member companies, each an institution in safety.



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7	NFPA 652 - Standard on Fundamentals of Combustible Dust - Understanding the Requirements of this New NFPA 652	1 day	0.6	March 29 September 13
8	Process Safety Management - What is it? Why we need it?	1 day	0.6	March 30 September 14
9	Flash Fire and Explosion Hazards During Handling of Flammable Liquids and Gases	1 day	0.6	May 8 October 16
10	Combustible Dust Hazards: Prevention & Protection	1 day	0.6	May 9 October 17
11	Electrostatic Hazards: Assessment and Control of Ignition Risks	1 day	0.6	May 10 October 18
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# Chilworth, now a part of DEKRA Insight International Expertise in Industrial Process Safety

**30**  
YEARS OF  
EXPERTISE

**MORE THAN**  
**2,000**  
CLIENTS  
EACH YEAR

**LEADERS**  
IN INDUSTRIAL  
PROCESS SAFETY

Since our founding, Chilworth Technology, now a part of DEKRA Insight has always considered part of its mission to share its process safety expertise, knowledge of best practices, and industry experience through quality training. Currently the Chilworth Process Safety Academy provides one of the most comprehensive series of process safety courses in the world. As an IACET Authorized Provider, Chilworth Technology, Inc. offers CEUs for its programs that qualify under IACET guidelines.

Chilworth Process Safety Academy courses cover key aspects of process safety, including: Combustible Dust, Electrostatics, Process Safety Management (PSM), Process Hazard Analysis (PHA), Safety Instrumented Systems (SIS) and Safety Integrity Level (SIL), PSM, ATEX/DSEAR Compliance, Consequence Modeling, Chemical Reactivity, Emergency Relief Systems and much more.

From multiple global offices located in North and South America, Europe and Asia, Chilworth Process Safety Academy courses are delivered through a variety of methods and formats including:

- Multiple languages (e.g., English, German, Spanish, French, Italian, Chinese, Japanese, Portuguese, Hindi)
- Private, in-company training (at the client's chosen location)
- Public, open-enrollment (scheduled courses in various locations globally)
- Multimedia (instructor-led webinars, e-learning and computer-based delivery)

The ultimate objective of a technical training course is to provide understanding through the effective transfer of knowledge. Chilworth has designed its courses to achieve this objective through the use of multiple media and delivery methods, including:

- Instructor-led content presentation (using PowerPoint slides)
- Open question-and-discussion forum
- Instructor-led demonstrations
- Trainee participation through case studies and role-playing exercises
- Quizzes
- Course Evaluation Feedback forms
- Certificates of completion

This design helps ensure a diverse, engaging and effective learning experience through the use of auditory, visual and tactile based instruction.

To verify understanding of the subject material and to apply for eligible CEU's, Chilworth Technology administers a short course quiz with review at the end of each course, and a certificate is awarded to participants for each completed course.

We are also developing a diploma-based training curriculum for Process Safety Specialists comprised of three modules:

1. Core process safety competencies (explosions, chemical reactions, thermal instability, static electricity, etc.)
2. Process Hazard Analysis (including HAZOP, What-if and other PHA methodologies) and PHA leadership
3. Advanced process safety (vent sizing, safety instrumented systems, etc.)

# DEKRA Insight, your global partner in bringing Process Safety Competence to your organization

## OUR COMPETENCE DEVELOPMENT PROGRAMS ARE:



## OUR SOLUTIONS ARE:



## OUR IN-COMPANY PORTFOLIO INCLUDES:

**Effective**, with our Process Safety expertise honed to deliver the appropriate knowledge to the appropriate staff; establishing clear targets and skills to be developed with information applicable in day-to-day activities

**Impactful**, accompanied by testing and managerial follow-up (before and end-of-course grade tests, communication of skills developed)\*

**Globally Consistent**, ensured through adherence to a global syllabus agreed by our facilitators in all locations

**Sustainable**, refreshed regularly to update knowledge and proficiency

- **Custom made** & focused on your own operational process\*
- **Flexible** (open/ in-company/ webinar/ e-learning platform)
- **At your own pace** (one-shot, quarterly, annual)
- **Complimented** by extra services (hotline experts, supplementary back-up training or refresher sessions)\*

- Best Practices in PSM Programs
- Understanding Process Safety Hazards
- Hazard Identification and Risk Analysis
- Safeguards and Layers of Protection

For an informal discussion on our tailored In-Company solutions, please call **609-799-4449** or email [safety-usa@chilworthglobal.com](mailto:safety-usa@chilworthglobal.com).

### OUR TRAINING EXPERTISE:

- In-company, open training, e-learning and webinars
- Multi-level audience: engineers, scientists, managers, technicians, operators and board members
- Our trainers: highly experienced process safety practitioners in industry
- Senior experts in their fields, providing a high level of advice and able to answer professional questions from experience

# 30 years of open course & in-company training, with new additions in e-learning and webinars.

While open training events can provide a good platform for training small numbers of staff, or introducing topics to specific individuals, corporate competency programs benefit greatly from in-company delivery.



## Open-training

Traditional classroom education is the starting point for genuine competence.

We offer over 100 open training courses delivered through our local centers of excellence across the globe (Europe, America, Asia and the Middle East) in a wide variety of languages. You can discover all our training sessions in our Global training calendar available on our website.

The course portfolio we have built up to over 30 years is interactive, including practical case studies, examples from industry with workshops and live demonstrations where possible.

### Our 2017 venue:

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.

All NJ locations will be located at:

Chilworth  
113 Campus Drive  
Princeton, NJ 08540  
609-799-4449

A list of hotels in the area can be provided for overnight stays.



## In-company

We work with you to develop a suite of courses tailored to YOUR process safety proficiency program, YOUR industry, and YOUR needs.

Chilworth has partnered with many clients to raise process safety awareness across teams, sites and entire corporations.

Before developing a program, we assess knowledge gaps and establish clear targets and skills to be developed which are most relevant to day-to-day activities in specific roles.

We have a range of core competencies and specialist process safety courses which can be adapted to suit the specific requirements of your organization. Our in-company sessions can be conducted at your premises, anywhere in the world, which is particularly useful if you have a large number of delegates in need of training or need to tailor a course to a specific process/industry. Sessions will be held at a time convenient to you, and can work out to be a more cost-effective option as delegate travel and accommodation expenses are not required.



Chilworth Technology, Inc. has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 12100 Sunset Hills Road, Suite 130, Reston, Virginia 20190, 703-234-4065.

# The Chilworth Process Safety Academy provides a global platform for consistent education, according to established syllabi, in all core elements of Process Safety

1

Best Practices in Management of Process Safety

- The Essentials of Managing Process Safety
- Process Safety Information: The Cornerstone of PSM
- Dust Explosions: Theory, Prevention & Protection
- Gas/Vapor Explosions: Theory, Prevention & Protection
- Chemical Reaction Hazards and Thermal Stability of Materials
- Ignition Sources including Electrostatics Hazards

2

Understanding Process Safety Hazards

- Practical Process Hazards Analysis
- Consequence Modeling
- Quantitative Risk Assessment (QRA)
- Facilities Siting Risk Assessment

3

Hazard Identification and Risk Analysis

- Protection Against Deflagration (Vapors and Powders)
- Classification and Management of Hazardous Areas
- Design of Emergency Relief Systems
- Creating a Mechanical Integrity Program
- Creating a Management of Change Program
- Pre-Startup Safety Reviews (PSSR's)
- Functional Safety Management & SIL Assessments

4

Safeguards and Layers of Protection

- Efficient Process Safety Management System Auditing
- Process Safety Metrics & Leading Indicators
- Incident investigation: Methods & Case Studies
- Lessons from Accidents in the Process Industries



# NFPA 652 - Standard on Fundamentals of Combustible Dust - Understanding the Requirements of this New NFPA 652

**Duration:** 1 day

**Session Code:** NFPA 1 **CEU's:** 0.6 **Price:** \$595 **Time:** 9:00-5:00pm **Dates:** 3/29 & 9/13

The new NFPA 652 will be coming into effect very shortly with certain mandatory requirements for the management of the fire, flash fire, and explosion hazards posed by combustible dusts. Although this standard provides some flexibility in approaches for ensuring the safety of the occupants, facility, processes, and equipment, some of the requirements must be complied with retroactively.

With over 25 years of experience in conducting thousands of dust hazard assessments and control studies for our clients around the world, we have designed this one-day workshop to help you better understand the applicability of this new standard and make the compliance with its requirements manageable and practical.

## Content:

### Introduction

- Requirements for the design, construction, maintenance, and management system of equipment and processes
- Retroactive Requirements
- Requirements for Appropriate Combustibility/Explosibility Data
- Requirement Options for Ensuring Safety of the occupants, facility, processes, and equipment
- Dust Hazard Analysis (DHA)
- Risk Assessment to Determine the Level of Design and Features for;
- Written Management Systems for Operating Safe Operation of the Facility and Equipment, Including:
- Performance-Based Alternative Designs

### Discussion

### Quiz

### Course Evaluation Sheet

### You Will Learn:

- Determine if a dust flash fire or explosion hazard exists within your facility;
- Compliance requirements of NFPA 652;
- Identify the gaps in the dust hazard management systems;
- Identify gaps in your facility's dust fire and explosion prevention and protection requirements;
- How to investigate the validity of any laboratory data that you might already have to support the NFPA 652 compliance requirements;
- Identify any gaps that might exist in the required laboratory data;
- Identify the dust sample(s) that need to be tested and the necessary laboratory tests;
- Conduct a Dust Hazard Analysis (DHA);
- Identify practical measures for not only ensuring compliance but going beyond compliance

## Audience

- H&S personnel - Engineering Staff - Plant Engineers - Regulatory Staff - Staff Working in Hazardous Areas



## Process Safety Management: What is it? Why we Need it?

**Duration:** 1 day

**Session Code:** PSM 1 **CEU's:** 0.6 **Price:** \$595 **Time:** 9:00-5:00pm **Dates:** 3/30 & 9/14

There is the belief that only large companies that have large quantities of hazardous chemicals should establish a sound process safety management strategy. This myth is discussed in the session. The need to differentiate a strategy for Process Safety to Occupational Safety is also discussed. Finally the different strategies for a sound Process Safety Management System are introduced and key elements explained.

### Content:

- Introduction to PSM
- OS Management vs. PS management – different objectives, different strategies
- What is process safety management?
- Notable Accidents involving process safety and business case for PS
- The “Large Company / Covered Quantity” myth about PSM needs
- Recent accidents involving small chemical quantities
- The warning signs of a deficient PSM system
- What is a process safety management system?
- Covered processes and applicability of national codes and standards
- Performance based versus prescriptive standards
- The OSHA PSM Standard
- Elements of the PSM Standard
- Process safety versus process risk
- The CCPS RBPS System
- Key recommendations to leadership for improving or adapting an effective Process Safety Management System

### You Will Learn:

- The importance of process safety management
- Key regulatory requirements related to process safety
- How process safety principles apply globally to companies of any size
- The key features of an effective process safety management system
- The differences and benefits from OSHA PSM standard, vs CCPS Risk Based Process Safety Elements
- What Leadership must focus on to encourage success in process safety
- The foundation needed to design or upgrade a process safety management system

### Audience

- H&S personnel - Engineering Staff - Plant Engineers - Regulatory Staff - Staff Working in Hazardous Areas





# Flash Fire & Explosion Hazards During Handling of Flammable Liquids & Gases

**Duration:** 1 day

**Session Code:** LIQ GAS 1-2 **CEU's:** 0.6 **Price:** \$595 **Time:** 9:00-5:00pm **Dates:** 5/8 & 10/16

This course is designed to enable engineers and process safety personnel who are involved with chemical processes and operations to identify the hazards associated with flammable gases, vapors, and mists. This course overviews flammability properties, testing methods, and practical explosion prevention techniques. This course also includes short participant exercises.

## Content:

### Introduction to Flammable Atmospheres

- Basic Theory and Definitions

### Flammability of Vapors, Gases and Mists

- Flammability Properties: Flash Points, Temperature Limit of Flammability, Flammable Ranges, Explosion Severity, Autoignition Temperatures, Limiting Oxidant Concentration
- Testing Methods
- Operating Conditions that Affect Flammability Properties

### Conditions Affecting Flammability Properties

- 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
- Minimizing Consequences of Fire
- Venting, Isolation, Suppression

### Q&A/Group Discussion

### Quiz

### Course Evaluation Feedback Form

### You Will Learn:

- How to assess the flammability hazards associated with gas, vapor and mist atmospheres
- How to apply a Basis of Safety for your operations

## Audience

- Personnel (e.g., management, technical, operations and maintenance) involved with process safety, EH&S, process design, operations and maintenance from the chemical & processing industries, including bulk and finished pharmaceuticals, chemicals, petrochemicals, oil and gas, food, plastic & rubber, metals, textiles, wood & paper and agrochemicals who desire a more in depth understanding of gas & vapor explosion hazards.



## Combustible Dust Hazards: Prevention & Protection

**Duration:** 1 day

**Session Code:** COMDUST 1 **CEU's:** 0.6 **Price:** \$595 **Time:** 9:00-5:00pm **Dates:** 5/9 & 10/17

This course will demonstrate the techniques available for both preventing dust explosions and protecting people and facilities from their effects. It employs a systematic approach to dust explosion hazard assessment directed towards obtaining a Basis of Safety for a process.

### Content:

#### Introduction

- Basic Theory and Definitions
- History of Dust Explosions
- Conditions for a Dust Explosion

#### Dust Hazard Codes & Standards

- OSHA's & EPA's "General Duty" clauses
- OSHA Instructions on Combustible Dust – National Emphasis Program
- U.S. and International Fire, Mechanical & Building Codes
- NFPA and other Recommended Practices
- How Codes and Standards Apply to Your Facility and Workplace: Case Study

#### Combustibility Assessment Using Standardized Laboratory Testing

- Ignition Sensitivity
- Explosion Severity
- Thermal Instability
- Hands-on Demonstration of Various Types of Dust Tests in the Laboratory

#### Conditions Affecting Combustibility

- Oxidant
- Temperature
- Physical Characteristics
- Moisture

#### Dust Explosion Hazard Control (Basis of Safety)

- Avoiding Flammable Concentrations
- Avoiding Ignition Sources
- Avoiding Oxidant
- A Problem-Solving Workshop to Evaluate the Explosion Hazard of Dust Handling Equipment

#### Explosion Protection Techniques

- Pressure Relief Venting
- Suppression
- Containment
- Isolation

#### Case Studies

#### Q&A/Group Discussion

#### Quiz

#### Course Evaluation Feedback Form

#### You Will Learn:

- How to analyze various conditions under which dust explosions can occur
- How to compare the techniques to prevent dust explosions
- How to apply suitable measures for protection of people and facilities from the effects of an explosion
- The role of Codes and Standards in evaluating risks
- How to choose methods to estimate dust hazard properties

### Audience

- Personnel (e.g., management, technical, operations and maintenance) involved with process safety, EH&S, process design, operations and maintenance from the chemical & processing industries, including bulk and finished pharmaceuticals, chemicals, petrochemicals, oil and gas, food, plastic & rubber, metals, textiles, wood & paper and agrochemicals who desire a more in depth understanding of dust explosion hazards.



# Electrostatic Hazards: Assessment & Control of Ignition Risks

**Duration:** 1 day

**Session Code:** STAT 2-3 **CEU's:** 0.6 **Price:** \$595 **Time:** 9:00-5:00pm **Dates:** 5/10 & 10/18

This course will discuss and demonstrate how and where electrostatic charge is generated, how to analyze static problems, and how to apply effective solutions. Practical static control techniques will be illustrated by examining case histories of explosion incidents investigated by Chilworth Technology consultants.

## Content:

### Introduction to Electrostatics

- Background Information and Definitions

### Types of Electrostatic Discharges

- Four Types of Discharges
- Evaluation of discharges in terms of incendivity in Gas, Vapor, Aerosol and Dust Cloud Flammable Atmospheres
- Hands-on Demonstration of various types of discharges in the laboratory

### Factors Affecting Electrostatics

- Relative Humidity
- Temperature
- Resistivity of Powders and Liquids
- Transport Mechanism (pneumatic, screw, spray, manual pouring etc)
- Immiscible Flows

### Tests to Evaluate Electrostatic Characteristics of Powders and Liquids

- Volume Resistivity and Charge Relaxation Time – Powder
- Chargeability – Powder
- Conductivity – Liquid
- Chargeability – Liquid
- Hands-on Demonstration of Various types of Electrostatic Tests in Laboratory

### Electrostatic Tests in Laboratory

- A systematic approach to the diagnosis of electrostatic hazards associated with:
  - People, Equipment and Facilities
  - Powder Handling
  - Liquid-Vapor Handling
  - Use of Plastics
  - Use of Flexible Intermediate Bulk Containers (FIBCs) (Super sacks)

### Case Studies

### Q&A/Group Discussion

### Quiz

### Course Evaluation Feedback Form

### You Will Learn:

- How electrostatic charge is generated in industrial environments
- How to recognize those electrostatic hazards that can trigger industrial fires and explosions
- How to choose methods to evaluate and control electrostatic charge in order to reduce or eliminate such risks

## Audience

- Personnel (e.g., management, technical, operations and maintenance) involved with process safety, EH&S, process design, operations and maintenance from the chemical & processing industries, including bulk and finished pharmaceuticals, chemicals, petrochemicals, oil and gas, food, plastic & rubber, metals, textiles, wood & paper and agrochemicals who desire a more in depth understanding of electrostatic hazards.



## Electrical and Mechanical Equipment Selection for Hazardous Areas

**Duration:** 1 day

**Session Code:** EQUIP 1-3 **CEU's:** 0.6 **Price:** \$595 **Time:** 9:00-5:00pm **Dates:** 5/11 & 10/19

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 these areas can be minimized by either the specification of suitable equipment/devices, or relocating them to a safe, non-hazardous area.

### Content:

#### 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, Class I, Class II and Class III
- 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

### Audience

- Personnel (e.g., management, technical, operations and maintenance) involved with process safety, EH&S, process design, operations and maintenance from the chemical & processing industries, including bulk and finished pharmaceuticals, chemicals, petrochemicals, oil and gas, food, plastic & rubber, metals, textiles, wood & paper and agrochemicals who desire a more in depth understanding of how to evaluate and select electrical and non-electrical equipment for use in hazardous areas.

#### 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

#### Quiz

#### Course Evaluation Feedback Form

#### You Will Learn:

- Ignition hazards that can be created by electrical and non-electrical equipment and devices
- The regulatory requirements of codes and standards for the classification of hazardous areas
- How to perform a hazardous area classification study
- The classification of areas where flammable atmospheres can arise from the presence of combustible dusts, flammable gases or vapors



# Chemical Hazard Assessment and the Prevention of Runaway Reactions

**Duration:** 1 day

**Session Code:** CRH 1-3 **CEU's:** 0.6 **Price:** \$595 **Time:** 9:00-5:00pm **Dates:** 5/12 & 10/20

This course will teach attendees how to identify the thermal and chemical reactivity hazards associated with a chemical process based on the principles of scale-up and development. Attendees will learn how to conduct risk analysis of reactive systems to ensure safety prior to process operations and how to interpret the results of preliminary screening tests through the use of chemical engineering concepts relating to safe plant operation. The course will discuss characterization of thermal runaway reaction through calorimetry methods and the latest techniques for process optimization.

## Content:

### Introduction

#### How and Where Hazards Arise

- Case Histories Involving Runaway Reactions and Current Legislation

#### Chemical Reaction Hazard (CRH) Assessment Strategy

- CRH vs. Process Life Cycle

#### Fundamental Principles of Scale-up and Reaction Runaway

- Vapor Pressure Effects
- Heat of Reaction
- PHI Factor
- Adiabatic Temperature Rise
- Reaction Rate
- Reaction Kinetics
- Kinetics of Heat Release/Loss
- Heat Loss Considerations
- Reactant Accumulation

#### Small Scale Screening Tests

#### Identification of Highly Energetic Materials

- Strategy for Assessing Explosivity
- Oxygen Balance
- CHETAH Calculations
- Testing for Explosive Properties

#### Reaction Characterization Through Calorimetry

#### Characterization of Thermal Runaway Reaction Through Adiabatic Calorimetry

- Accelerating Rate Calorimetry
- Adiabatic Dewar Calorimetry
- Pressure Compensated Calorimetry

#### Inherently Safe Process

- Safe Process
- Integrating Safety Considerations into Process Design

#### Problem Solving Sessions

#### Q&A/Group Discussion

#### Quiz

#### Course Evaluation Feedback Form

**You will need to bring a scientific calculator to this course.**

#### You Will Learn:

The course will teach attendees how to assess chemical reactivity through:

- Use of Chemical Engineering principles to study the potential runaway reactions for storage and reactor risk assessments
- Small-scale studies
- Performing risk analysis of chemical processes
- Development of inherently safer processes

Problem solving sessions are included throughout the course, and the course incorporates case study scenarios to illustrate and extend the material.

## Audience

- The course will benefit attendees from a broad spectrum of backgrounds and job responsibilities including chemical engineers, process engineers/scientists, plant/process safety/risk managers, facilities managers and others who need to understand the risks and hazards that can lead to accidents, injuries, property damage and business interruptions to the plant.

# About Chilworth Technology, now a part of DEKRA Insight

Serving the process industries since 1986, Chilworth Technology, now a part of DEKRA Insight is a worldwide leader in process safety services, providing a full array of Process Safety Engineering (PSE) and Process Safety Management (PSM) services including: consulting, training, laboratory testing and specialized process safety testing instrumentation and equipment.

Unmatched technical expertise enables Chilworth Technology, now a part of DEKRA Insight to provide best-in-class solutions – delivered by a large number of highly experienced multi-disciplinary engineers and Process Safety Specialists. Chilworth Technology delivers consistent quality worldwide and meets the needs of multinational companies that require integrated, consistent services tailored to local cultures and operational and regulatory requirements.

## **PSM services include:**

- PSM program development and program enhancement
- PSM needs assessments and gap analysis
- PSM applicability assessments
- PSM and RMP audits
- Process Hazard Analysis leadership (using HAZOP, What-if, FMEA, Fault-tree Analysis and related PHA techniques)
- Incident investigation
- Facility Siting Analysis
- Consequence Modeling
- PSM training

## **PSE services include:**

- Laboratory and full-scale testing of:
  - powders/dusts
  - liquids and gases for their flammability/ combustibility
  - reactivity
  - thermal stability
  - electrostatic properties
- On-site and desktop fire and explosion hazard assessments
- Process design/safety engineering support
- Expert witness testimony and litigation support
- PSE training

DEKRA Insight is the global leader in safety at work. We guide clients in transforming their organizational culture and their operational environment, enabling them to reduce exposure to injuries, save lives, protect assets and achieve safer performance.

# Training Course Schedule

Course	Price	Duration	March	May	September	October
NFPA 652 - Standard on Fundamentals of Combustible Dust - Understanding the Requirements of this New NFPA 652	\$595	1 Day	29		13	
Process Safety Management: What is it? Why we Need it?	\$595	1 Day	30		14	
Flash Fire & Explosion Hazards During Handling of Flammable Liquids & Gases	\$595	1 Day		8		16
Combustible Dust Hazards: Prevention & Protection	\$595	1 Day		9		17
Electrostatic Hazards: Assessment & Control of Ignition Risks	\$595	1 Day		10		18
Electrical and Mechanical Equipment Selection for Hazardous Areas	\$595	1 Day		11		19
Chemical Hazard Assessment and the Prevention of Runaway Reactions	\$595	1 Day		12		20

## Registration

You can register and pay for any training course by logging onto [www.dekra-insight.com/en/training-and-events/process-safety-academy](http://www.dekra-insight.com/en/training-and-events/process-safety-academy). We accept Visa, Mastercard and American Express. You will receive a confirmation of your registration emailed to you following your registration. Course fees include continental breakfast, breaks and lunch.

Each day of training starts at 9:00am and ends at 5:00pm.

## Cancellations

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

# In Company Training

**Chilworth Process Safety Academy** courses can be delivered as private, in-company training at the location of your choice.

In-company training provides companies the option of customizing courses to meet specific company training needs. For example, courses can be tailored to different technical levels reflecting the audience mix (e.g., Managers, Engineers or Operators.) Clients can also provide company-specific or site-specific training content, such as specific company practices or process examples, to be added to the course to complement Chilworth course content and used for practical exercises. In-company course delivery is also a cost-effective method of training multiple employees and can be scheduled to accommodate participants' availability.

## Recent examples of in-company delivery include:

- Global PSM training courses delivered in the U.S., Europe and Asia for a major multinational chemical company
- ATEX training delivered across multiple sites to plant operators of a global pharmaceutical company
- International training sessions on Security Management Process (SMP) in the U.S., Europe and Asia for a multinational chemical company
- Multi-site Flammability and Chemical Reaction Hazard training for a major pharmaceutical laboratory
- Multi-site training on Combustible Dust Hazards
- Training and application of (Non-electrical) Mechanical Ignition Risk Assessment (MEIRA) to sites in Europe, Asia and the U.S.
- PHA Team Member and PHA Team Leader training delivered at a major industrial manufacturer's technical center.

Whether you are an individual needing to develop your expertise on a specific process safety topic or a company that requires a comprehensive program of process safety training for management, engineers, operators, maintenance or other plant staff, the Chilworth Process Safety Academy will deliver a customized training solution to meet your needs.



Chilworth Technology, Inc. has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 12100 Sunset Hills Road, Suite 130, Reston, Virginia 20190, 703-234-4065.



# Trainers' Biographies

**Vahid Ebadat**, Ph.D., M.Inst.P, MIEE, C.Eng., C.Phys. is the Chief Technical Officer - Process Safety. 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 Particulate 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.

**Thaddeus C. Speed**, physicist and safety professional, is the Senior Process Safety Specialist for DEKRA Insight's explosives testing and analysis division, Safety Consulting Engineers, Inc. Mr. Speed has more than 25 years experience in hazards analysis, process and system safety, and in testing, evaluating and characterizing explosives and other energetic materials. He has published numerous papers on electrostatic discharge safety (ESD), explosives testing methods, ignition and initiation phenomena, in-process classification of energetic materials, and similar topics. B.S. Physics and Astronomy (1984); Certified Safety Professional (1994); approved by the DOT to examine explosives and recommend classifications [per 49 CFR 173.56] (1999).

Mr. Speed's explosives process hazards and characterization expertise is further enhanced by an in-depth understanding of system safety and the inter-related areas of facility siting, regulatory compliance, process safety management, material characterization and incident analysis. He has developed courses and trained government officials, plant managers, other safety professionals and line operators in various aspects of explosives safety, both as general courses and as tailored training for specific issues, companies and operations.

**David E. Kaelin, Sr.**, B.S.Ch.E., Mr. Kaelin has over 30 years experience in the specialty chemical manufacturing industry and 20 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 has led or provided technical assistance to many fire, explosion and runaway reaction incident investigations including incidents involving nitrations, chlorinations, hydrogenations, thermal heat transfer fluids, spontaneous combustion, dust explosions and thermal oxidizer and incinerator operations.

Mr. Kaelin is an expert in the application of hazard recognition techniques including: HAZOP, FMEA, What-If, Fault Tree Analysis, Risk Screening and Checklist. He is an active member of AIChE, and NFPA.

**Swati Umbrajkar**, Ph.D. is the Manager of the Chemical Process Evaluation Group. Dr. Umbrajkar received her Doctorate from the New Jersey Institute of Technology. Her research interests include the synthesis of metal/metal oxide nanocomposites; analysis of highly energetic materials using X-ray diffraction, scanning electron microscopy (SEM), differential scanning calorimetry (DSC), and a number of post analysis techniques to characterize the thermodynamic and kinetic parameters of a test system.

Dr. Umbrajkar consults with clients on a variety of process safety issues including but not limited to high-pressure DSC cell tests, adiabatic calorimetry (ARC and ADC), reaction calorimetry (RC-1), all of which allow for the safe scale-up of batch and semi-batch processes. She has expertise in determining self-acceleration decomposition temperature (SADT) and time to maximum rate (TMR), which are critical issues associated with the storage of bulk materials. As the Manager and Consultant in the Chemical Process Evaluations Laboratory, she is proficient in the interpretation of data for a wide variety of process safety scenarios. She has authored several articles in the fields of, 'Synthesis and Analysis of Highly Energetic Materials' and 'Chemical Process Safety'.

She received the Excellence Award from NASA for her services in NASA's SHARP student program in 2005 and Research Experience for Undergraduate (REU) students at the New Jersey Center for Engineered Particulates (NJCEP) in 2006. She was awarded the Best Graduate Student Research Overall presented at the Graduate Student Research Day on November 6, 2006. She is also the recipient of the 'best presenter' award at the AIAA (American Institute of Aeronautics and Astronautics) Young Professionals in Science and Engineering Conference (Northeast Section) in November 2006. She is a member of the American Institute of Chemical Engineers.

# Trainers' Biographies

**Richard W. Prugh**, M.S.Ch.E., CSP, PE, Mr. Prugh is a Senior Process Safety Specialist and provides process safety engineering expertise to clients at large and small plants to improve the safety of chemical manufacturing operations. During his career with the Du Pont Company, he was involved in instrument engineering, explosion-hazards testing, explosives manufacturing and testing, pilot-plant supervision, organic-chemicals research, safety and fire protection audits, and process-safety consulting. Since 1985, he has provided process safety services to chemical and petrochemical plants in thirty-two states and in twelve foreign countries. He is the author of "Guidelines for Vapor Release Mitigation" and 25 presentations to Loss Prevention Symposia, and he prepared the "Toxicity" section for the 2008 issue of "Perry's Chemical Engineers' Handbook" and the "Safety" sections for three encyclopedias. His recent experience involved overseeing the safety analyses of nerve-gas destruction plants and auditing the safety status of a dozen off-shore installations, including evaluation of management and employee safety culture.

**Vladimir Stetsovsky**, M.S., is a Senior Process Safety Specialist with over 30 years experience in the manufacturing industry and utilities, and 18 years specializing as an Electrostatic Safety Engineer. His career involved converting and specialty chemical manufacturing with numerous hazardous chemicals in both batch and continuous operations. He has participated in the design and construction of several large chemical and converting processing facilities and provided support and training in all areas of Process Electrostatic Safety Management. As an Electrical Engineer he has led process hazard analysis, risk assessments and facility siting reviews. At the corporate level he has created installation specifications and taught courses in ESD and hazard recognition methods and provided technical safety support to manufacturing sites producing adhesives and pressure sensitive products.

Mr. Stetsovsky has led or provided technical assistance to many fire and explosion incident investigations including incidents involving thermal heat transfer fluids, spontaneous combustion, dust explosions and thermal oxidizer and incinerator operations. In these investigations he has provided valuable insight into the root cause and made practical suggestions for eliminating or controlling the identified hazards.

**Steven J. Luzik**, PE, CFEI, is a Senior Process Safety Specialist. with over 30 years experience in the area of fire and explosion hazards including gas/vapor explosions, dust explosions and fire and explosion protection strategies. He graduated from the University of Notre Dame with a BS degree in Chemical Engineering. He is a registered Professional Engineer in the State of Pennsylvania and a Certified Fire and Explosion Investigator (CFEI) with the National Association of Fire Investigators (NAFI). As a former Mine Safety and Health Administration [MSHA] manager and technical specialist, he has investigated a multitude of incidents involving flammable vapors, gases and dusts that have included surface and underground mining facilities and industrial facilities where fires and explosions have occurred. He has conducted dust explosion hazard assessments at several coal-fired power plants.

He also has served as a moderator of a flammability and dust explosibility laboratory, processing requests from MSHA and other Federal agencies for testing to determine the flammability and explosibility properties of solids, liquids, dusts and vapors. In this capacity, he has been called upon to provide expert testimony on the explosibility hazards associated with the manufacturing, processing and handling of these materials. He is a member of the American Society for testing and Materials (ASTM) E-27 Committee on Hazardous Properties of Chemicals, the National Association of Fire Investigators (NAFI) and the National Fire Protection Association (NFPA). He has authored numerous publications in the areas of fire and explosion prevention, protection and investigation.

**Robert L. Gaither**, CSP, Ph.D., is a Senior Process Safety Specialist. Dr. Gaither has more than 30 years experience in company operations, regulatory compliance, management consulting, and process safety/risk management. He has led organizations at site, division and corporate levels to achieve record safety performance, significant cost savings, and external / internal recognition for accomplishments.

Dr. Gaither has proven leadership and interpersonal skills that enable customers to discover synergies for business excellence. His keys to successes are working effectively with all organizational levels, strong communication skills, assessing customer/business partner needs and finding solutions, mentoring staff, promoting teamwork, and leveraging systems and resources already in place.

Dr. Gaither is a trained expert in HAZOP and SIL/LOPA Facilitation; and Chevron RISKMAN2 / IHAZID Process. He is also a trained and experienced PHAST User.

# Trainers' Biographies

**Pieter Zeeuwen**, M. Sc., is a Senior Process Safety Specialist. He has more than 30 years experience in the gas and dust explosion fields, including materials testing, small and large scale explosion research, and consultancy for industry and government agencies in a number of countries. His areas of expertise include gas and dust explosion hazard assessment, gas and dust explosion prevention and protection, electrostatic hazard assessment, hazardous area classification, and gas cloud explosions as well as incident investigations.

Over the years, Mr. Zeeuwen has served on many working groups including various Standards committees, both nationally and inter- nationally, e.g. most recently CEN (European Standards Committee) working groups on explosion protection methods and on test methods. He regularly lectures on various aspects of explosion safety and acts as seminar chairman and course director. Mr. Zeeuwen has published numerous articles in scientific journals and presented many papers at international conferences.

**Walter S. Kessler**, B.S.Ch.E., Mr. Kessler has 23 years experience in the refinery, gas processing, specialty chemical, pharmaceutical, manufacturing, and HVACR (Heating, Venting, Air Conditioning and Refrigeration) industries, including 8 years experience performing Process Safety Engineering functions. He was instrumental in the design and construction of several refinery, gas and chemical processing facilities, designing a pharmaceutical filling process, improving several manufacturing processes, and also has experience in six sigma and lean manufacturing. He has been involved in HAZOPS on new and existing facilities, developing and designing DCS and SIS control systems and the associated cause and effect charts, process safety reviews, and developing and implementing various stages of the 14 elements of the PSM program in facilities. He has a very safety conscious attitude and perspective and has even trained with and been actively involved in chemical plant ERT teams.

**Lisa C. Hutto**, B.Sc., MBA, is a Senior Process Safety Specialist with over 23 years of combined HSE&S experience in manufacturing, chemical and oil and gas industries with 12 of the years specializing in Process Safety Management. She has an extensive background in health, safety, environmental and security, to include the reduction of incident rates, reduced emissions by implementing new projects, facility security development, as well as being the driver for supporting business and HSE objectives. Her PSM experience includes implementing and developing new Process Safety Management programs, PSM Audits and Gap Analysis, establishing management of change programs, developing procedures for all 14 elements of PSM, emergency response plan development and leading Process Hazards Analysis for oil and gas, chemical and manufacturing companies. She also has a strong background of upstream and downstream oil & gas experience, to include work on the North Slope of Alaska, with multiple oil & gas companies.

**Guibing Zhao**, Ph.D. is a Process Safety Specialist. Dr. Zhao received his Doctorate of Chemical Engineering from the Sichuan University in China. His research interests include emergency relief system design using DIERS technology; chemical process safety evaluation; multiphase flow hydrodynamics; customized calorimetric technology including water bath and water flow calorimetry; high temperature molten salt electrolyte based fuel cell and battery technology; nonthermal plasma technology for gas processing including NO<sub>x</sub> abatement, methane and hydrogen sulfide conversion, and plasma enhanced hydrogen separation; supercritical CO<sub>2</sub> enhanced oil recovery; microreactor; waste to fuel conversion; and advanced signal processing technology. He has participated in engineering design and scale-up of several chemical processing facilities. Dr. Zhao is proficient in the interpretation of data for a wide variety of process safety scenarios. He has authored 40+ peer- reviewed articles in the multidisciplinary fields.

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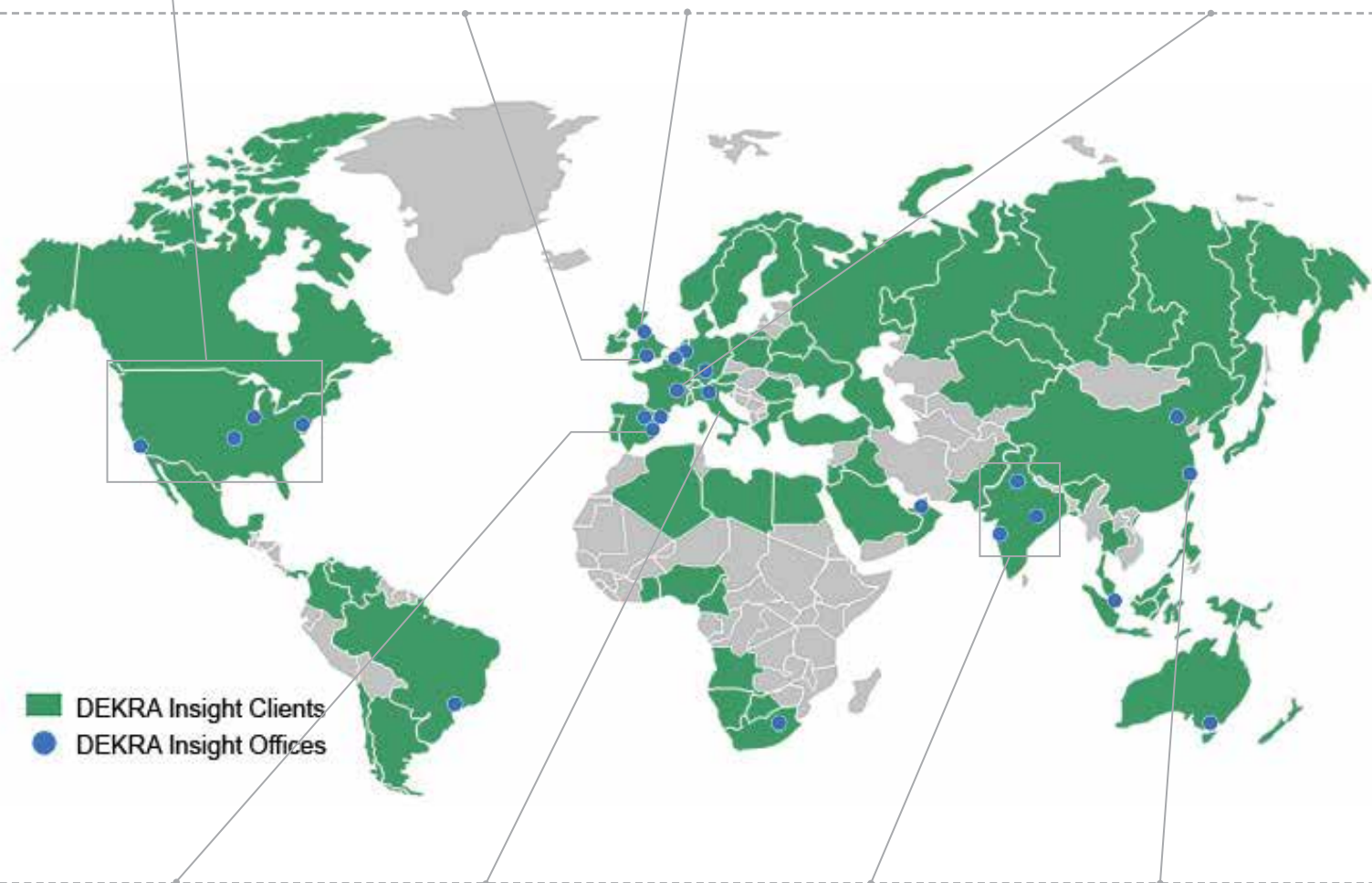
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