



Chemical Process Evaluation Services

*Improve the safety, yield and
profitability of your chemical process.*

Chemical Reaction Hazard Assessment

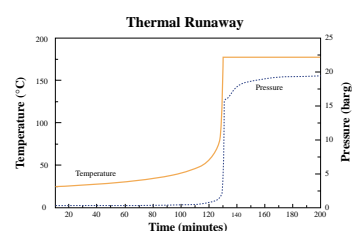
Thermal Runaway Laboratory Studies

Selection & Specification of Safety Measures

Emergency Relief Design including Vent Sizing

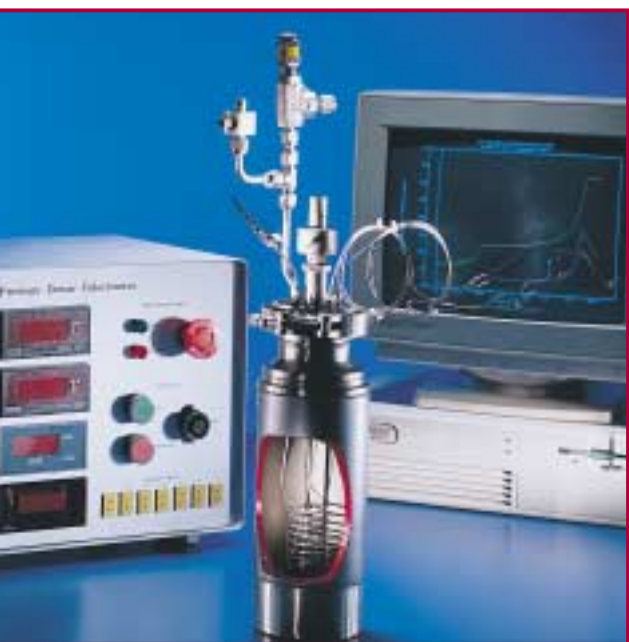
Optimisation of Existing Chemical Processes

Development of New Chemical Processes



Chemical Process Evaluation Services

Reaction Hazards and Thermal Runaway



Chilworth Technology Adiabatic Dewar Calorimeter.

Chemical companies around the world regularly perform exothermic chemical reactions as part of the normal manufacture of their products and intermediates. These reactions carry with them an inherent risk of loss of control, with potentially devastating effects on life and the environment as was so tragically illustrated by incidents at Seveso in 1979 and Bhopal in 1984.

THE CONSEQUENCES OF RUNAWAY REACTION

- violent loss of containment and severe explosion
- release of flammable substances leading to secondary fires and explosions
- injury or death
- release of toxic or ecologically damaging materials to atmosphere
- serious financial losses and damage to a company's reputation.

YOUR RESPONSIBILITIES

Legislation within the European Union, North America and in many other countries around the world places responsibility for the safety of employees and the protection of the environment with you – the employer. You have to *identify* potential hazards in your processes and *assess* the risk that they could present. You must then put in place procedures and equipment to *mitigate the hazards* and *control the risks*, with due regard to local standards, regulations and codes of practice.

IMPORTANT QUESTIONS

Have you conducted a comprehensive risk assessment of your process?

Is the risk assessment supported by accurate thermochemical test data, including isothermal and adiabatic calorimetry?

Has a safe and cost-effective Basis of Safety been identified and documented?

Have your safety systems been designed according to methods that are acceptable both internationally and locally?

HOW CAN WE HELP

With a wealth of experience, technical expertise and specialist equipment we provide a range of solutions from the following services:

Identification and assessment of process hazards

- thermal stability screening tests and thermochemical calculations
- reaction calorimetry including elevated pressure and reflux work
- adiabatic calorimetry and runaway simulation
- environmental discharge studies

Engineering solutions

- safety measure selection and specification
- emergency vent design (DIERS methodology)
- knock-out and quench vessel sizing
- reaction inhibition work.

Many existing chemical processes could be run much more efficiently with improved yield, better quality and greater speed. Our experience shows it is perfectly possible to achieve this without compromising safety or increasing environmental impact. Companies should take advantage of these opportunities to achieve financial gain and increased competitive edge. Yet they often do not pursue this potential for improvement for reasons which include:

- a false belief that the costs would outweigh the benefits
- lack of in-house staff time and resource to research the most appropriate solution
- lack of specialist equipment to trial new routes or process changes
- concerns over safety implications of changing the process
- over-familiarisation with the process so possibilities are not even considered.

WHAT SHOULD YOU DO

The first action is to carry out a technical review. This brings together existing expertise and data, to which is added new knowledge derived from external expertise and laboratory studies. All this can be undertaken with due regard to safety and the environmental implications of change.

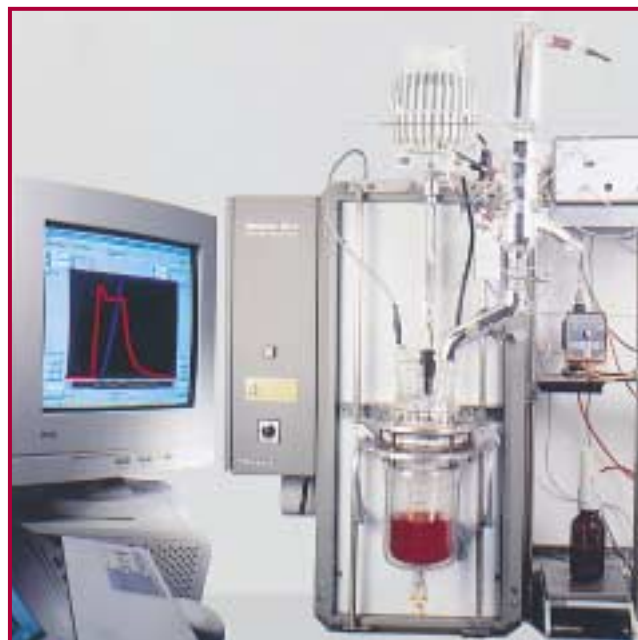
HOW CAN WE HELP

We have state-of-the-art technology and a wealth of experience in chemical process development and optimisation work. We can bring fresh, practical ideas to old processes and have the resources available to test and provide speedy solutions to your process improvement needs. We guarantee full confidentiality.

We can:

- review existing processes and develop new ones
- conduct automated laboratory reaction studies
- test under reflux and at elevated pressures
- perform factorial experimental designs
- assess safety and environmental implications of process change
- make practical and economical recommendations.

Chemical Process Development and Optimisation



Mettler RC1 Calorimeter.

Specialist Capabilities

- Adiabatic Dewar calorimetry
- Reaction calorimetry using a Mettler RC1
- Carius tube screening
- Differential scanning calorimetry (DSC)
- Evaluation of highly energetic materials including potential explosives
- Experimental blast chamber facility
- Handling of toxic and highly active materials
- Gas evolution rate measurements
- Mass spectroscopy.

Chemical Process Evaluation Services

Chilworth
Technology

the experts in process safety

THE BENEFITS

From Chilworth you obtain:-

- Impartial, professional and confidential advice.
- Access to laboratories which can safely test highly energetic and toxic material.
- Expert guidance on the selection of tests and interpretation of results.
- The availability of experienced process safety specialists to assist with the application of data and hazard assessment on plant.
- Testing to British and European standards (where applicable).
- Fast and reliable data.
- The confidence of knowing that data comes from GLP compliant laboratories.



Testing to GLP Standard



Consultancy



Training



CHILWORTH SERVICES

We offer a range of testing and consultancy services to the processing industry, covering:-

- Dust/Gas/Vapour Explosions
- Electrostatic Hazards
- Hazardous Area Classification
- Chemical Reaction Hazards
- Chemical Process Optimisation
- Regulatory Testing (NONS, CHIP, CPL, UN)
- ATEX Audits
- Major Hazards (Seveso II / COMAH)
- HAZOP
- Incident Investigation
- Expert Witness
- Training

For further information and a comprehensive list of the testing services available, please contact one of our offices detailed below.

CONTACT

Process safety experts are on hand at the following sites:-

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