Gas and vapour explosions

Successful assessment and control of the risks associated with gas and vapour explosions is crucial to safety.

The risk of gas or vapour explosion is present in a wide range of process industries. It can arise during normal operation, as a result of process abnormality, or during start-up and shut-down. Such events are generally devastating and can result in significant loss of life and damage to plant.

What we offer

Our consultants have many years’ experience in the assessment and control of gas and vapour explosion risks. We can undertake a total or part study on new plant, existing plant or plant modifications. We will identify hazards, assess risk and develop practical, cost-effective solutions. We offer everything from basic consultancy and advice, to complete engineering solutions.

ABB have experience in a wide range of explosion types including:

- BLEVE (Boiling Liquid Expanding Vapour Explosion)
- Vapour cloud explosions (VCE)
- Mist explosions
- Overpressure explosions
- Condensed phase explosions

Our proven approach for investigating and solving gas and vapour explosion issues can be split into four stages:

- Hazard identification - using a wide range of techniques such as; HAZOP, Process Hazard Review (PHR) PHA, LOPA etc
- Risk evaluation - modelling to determine likelihood and specific damage assessments
- Risk reduction - mitigation of results or reducing the likelihood
- Develop basis of safety - establish and document basis of safe operation

Within this framework we offer expertise in:

- Measurement and interpretation of explosion parameters and flammable data
- Fuel concentration and airflow measurement / modelling
- Detonation risk evaluation
- Evaluation of ignition sources including electrostatic hazards
- Hazardous area classification
- Explosion prevention (inerting, air dilution, fuel rich operation)
- Explosion protection (vent sizing, containment, suppression, isolation)
- Explosion consequence modelling
Our expertise in explosions can be applied to:

- Basis of safety and safety case development
- Auditing
- Incident investigations
- Occupied building risk assessments
- Hazard analysis

We have successfully applied these processes to assess and control gas and vapour explosion hazards in a range of situations including:

- Combined cycle gas turbine enclosures
- Hot oil systems
- Vent collection systems
- Centrifuges
- Chemical reactors
- Ethylene heat exchangers
- LPG storage spheres
- Solvent extraction plants
- Dryers

We have successfully applied these processes to assess and control gas and vapour explosion hazards in a range of situations including:

- PHAST professional for extent of flammable atmosphere and thermal radiation or blast overpressure effects
- Computational fluid dynamics for complex fuel concentration modelling
- Software for calculation of explosion pressures
- TNO ‘GAMES’ methodology for vapour cloud explosion modelling

Benefits
- Improved safety, health and environmental compliance
- Reduced risk of personnel injury and plant loss
- Reduced risk of plant downtime
- Fast delivery of a total solution
- A valid plant basis of safety

Why ABB?
Our engineers and consultants have operational backgrounds and make pragmatic technical judgements based on their experience. It’s an approach that ensures cost-effective, practical-to-implement solutions which work.

We can provide support from gap identification to full implementation of action plans.