



FAQ - FREQUENTLY ASKED QUESTIONS

## Hazard and Operability (HAZOP) Studies

Knowing what to expect before implementing a HAZOP analysis makes for a more successful and efficient process. To that end, here are some frequently asked questions and answers about how our HAZOP studies work.

### 1. What is a HAZOP Study?

The **Hazard and Operability (HAZOP)** analysis methodology is a systematic team-based Process Hazards Analysis (PHA) technique that can be used to effectively identify and analyse the risks of potentially hazardous process operations. It is used during the design stages of a new process or project, for major process modifications and for periodic review of existing operations.

### 2. What Is the purpose and approach of HAZOP?

The purpose of HAZOP is to prevent the release of hazardous materials and energy, followed by mitigation of the consequences should a release occur. It is essential for the team to identify all the hazards of the process being studied, not just the most obvious ones. Our approach is to use a semi-quantitative HAZOP that incorporates **Layers of Protection Analysis (LOPA)** to assess the reliability and number of safeguards.

### 3. What Are the Advantages of Undertaking a HAZOP Study?

HAZOP is a rigorous, structured, systematic and comprehensive method, and is adaptable to the majority of process industry operations. It fosters the exchange of knowledge and experience among the participants and enables companies to anticipate potential accidents.

### 4. Who Takes Part in the HAZOP Team?

HAZOP is a brainstorming exercise in which individuals from different disciplines participate. It is vital for the HAZOP team to be limited in size (ideally six people or fewer, excluding the HAZOP facilitator and, if there is one, the HAZOP secretary). It is difficult to establish a maximum and minimum number of participants in a HAZOP, since the various functions necessary may be assumed in different ways in different organisations. Nevertheless, and as a very

general criterion, it is safe to say that a HAZOP with fewer than three participants (excluding the HAZOP facilitator and secretary) cannot generate sufficient and meaningful discussion.

## 5. What Information Must Be Gathered in Preparation for a HAZOP Study?

HAZOP requires a review of all the available Process Safety Information (PSI) as well as identification of any missing PSI necessary for an effective HAZOP analysis. This includes, but may not be limited to:

- > Hazardous materials properties including combustibility, flammability, explosivity, reactivity, self-heating, toxicity, electrostatic properties
- > Process description
- > Process flow sheets
- > Operating procedures
- > Piping and instrumentation drawings (P&IDs)
- > Equipment design specifications
- > Pressure relief systems specifications
- > Site and industry data concerning process-component failure frequencies and probabilities of failure on demand (PFD).

## 6. How Long Does a HAZOP Analysis Take?

Estimating the duration of a HAZOP is not, of course, an exact science; it requires a good knowledge of the methodology, complexity of the process, nature of the risks that can be identified up front and, of course, the idiosyncrasy of the group. In no case should a HAZOP be carried out without an estimated agenda, but it is not acceptable for the estimation to be rigid and not subject to modification (up or down) as necessary.

## 7. What Is The End Product of the HAZOP Study?

At the conclusion of the HAZOP analysis, our process safety specialist will present the observations, findings, and conclusions of the analysis, and preliminary recommendations and suggestions of the HAZOP team to members of the site management. Shortly thereafter, our process safety specialist will submit a written draft report to the client outlining the HAZOP team's recommendations and suggestions for improvements to the process based on the site's experience and on recognised and generally-accepted good engineering practices. Following the receipt of comments from the client, a final report will be issued.

## 8. What mistakes are commonly encountered when implementing a HAZOP analysis?

Firstly, planning errors can negatively impact the HAZOP study. While an estimated time frame should be in place, lack of flexibility can lead to incomplete analyses. Another pitfall is insufficient, outdated, or missing information. In order to properly identify and address potential hazards, the HAZOP team must have access to timely and complete information. A lack of focus and discipline among team members is also a common problem. Allowing outside calls and interruptions during HAZOP meetings, as well as tardiness or absences hinders the team's progress. The so-called "minimalist HAZOP" is yet another typical mistake. This refers to superficial studies where key words or parameters are omitted, repetitions are frequent or templates are used, all of which can short-circuit the brainstorming work that allows the team to uncover less obvious risks and hazards. Finally, the "bureaucratic HAZOP" is a subset of the minimalist version. Here the process is reduced to a formulaic box-checking exercise, resulting in repetition and hampering a deeper analysis.

Would you like to get more information?

Contact Us

## DEKRA Process Safety

The breadth and depth of expertise in process safety makes us globally recognised specialists and trusted advisors. We help our clients to understand and evaluate their risks, and work together to develop pragmatic solutions. Our value-adding and practical approach integrates specialist process safety management, engineering and testing. We seek to educate and grow client competence to provide sustainable performance improvement. Partnering with our clients we combine technical expertise with a passion for life preservation, harm reduction and asset protection. As a part of the world's leading expert organisation DEKRA, we are the global partner for a safe world.

### Process Safety Management (PSM) Programmes

- > Design and creation of relevant PSM Programmes
- > Support the implementation, monitoring, and sustainability of PSM Programmes
- > Audit existing PSM Programmes, comparing with best practices around the world
- > Correct and improve deficient Programmes

### Process Safety Information/Data (Laboratory Testing)

- > Flammability/combustibility properties of dusts, gases, vapours, mists, and hybrid atmospheres
- > Chemical reaction hazards and chemical process optimisation (reaction and adiabatic calorimetry RC1, ARC, VSP, Dewar)
- > Thermal instability (DSC, DTA, and powder specific tests)
- > Energetic materials, explosives, propellants, pyrotechnics to DOT, UN, etc. protocols
- > Regulatory testing: REACH, UN, CLP, ADR, OSHA, DOT
- > Electrostatic testing for powders, liquids, process equipment, liners, shoes, FIBCs

### Specialist Consulting (Technical/Engineering)

- > Dust, gas, and vapour flash fire and explosion hazards
- > Electrostatic hazards, problems, and applications
- > Reactive chemical, self-heating, and thermal instability hazards
- > Hazardous area classification
- > Mechanical equipment ignition risk assessment
- > Transport & classification of dangerous goods

We have offices throughout North America, Europe, and Asia.

For more information, visit [www.dekra-process-safety.co.uk](http://www.dekra-process-safety.co.uk)

To contact us: [process-safety-uk@dekra.com](mailto:process-safety-uk@dekra.com)