# Guidelines for work in potentially explosive environments

These guidelines form the instructions for work in explosive environments at Örebro University. The instructions are based on the Swedish Work Environment Authority’s regulations on work in potentially explosive environments and general guidelines on the application of regulations (AFS 2003:3).

When working (research, teaching, studying and other activities) on premises where potentially explosive environments may exist, the following applies:

* The employer must ensure that persons working in potentially explosive environments or performing work that could compromise explosion safety have suitable training, knowledge of explosion risks and safety measures, and skills in safe handling. This includes but is not limited to, knowing what applies to the various zones in the corresponding classification plan. Training requirements apply to everyone, including drift, maintenance, and cleaning staff, such as teachers, students, researchers, temporary visitors, and contractors. For temporary visitors, a shorter safety briefing can suffice if escorted by staff.
* Everyone working more than temporarily in a premise where flammable goods are handled must be trained/informed about the following:
  + Presence of flammable goods, requirements for storage, signage, etc.
  + Risks of flammable goods (risk of explosion, ignition, spread of fire, etc.).
  + Possible ignition sources (e.g., static electricity, electrical appliances, open flame, etc.).
  + Possible consequences of improper handling (personal injury, property damage, etc.).
  + The information that must be available includes what protective equipment and how it is used, what safety measures must be in place and taken (for example, handling in fume hoods and bench tops), protective clothing, extinguishing equipment, and the type of electrical equipment that may or may not be used near flammable goods. Check the safety data sheets of each substance.
  + The location of the main shut-off valves.
  + Minimum staffing and the overall level of training to cope with work and unforeseen situations.
* Accidents and incidents must always be reported following the university’s incident reporting routine. In addition, all incidents of a serious nature are reported to the Swedish Work Environment Authority.
* Accidents and incidents must always be investigated, documented and risk-assessed. In the event of accidents and incidents, work may not be resumed until a new risk assessment has shown that work can be carried out safely.
* Warning signs must be provided wherever explosive environments may occur.

# **Inspection and maintenance when handling flammable gas**

The following must be inspected or maintained to reduce the likelihood or consequence of fire or explosion:

## Inspections of gas installations must be carried out as follows:

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| Inspection | Interval | Performer |
| Visual inspection of gas storage facilities.  Check for external damage.  Check couplings are tight using leak spray.  Check soft hoses do not have cracks.  Outlet posts in the lab environment are tight and have no external damage. | Continuously, i.e. when changing tubes | Supervisor flammable goods |
| Valves/fittings are tight using leak spray. | Quarter | Supervisor flammable goods |
| Signage (prohibition/warning EX). Marking of flammable gas pipelines. | Annually in connection with/during safety rounds | Supervisor flammable goods |
| Check the classification plan is up to date. | Annually in connection with/during safety rounds | Supervisor flammable goods |
| Electrical installation in the risk area. | Annually | Qualified electrician |
| Electrical grounding. | Annually | Resistance measurement by a qualified electrician |

# Documentation — inspection of gas installation for flammable goods

## Ongoing inspection

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| 🞎 | Check that there is no visible damage to piping/hose systems from gas cylinders or the outlet posts in Bilbergskahuset and Prismahuset. Upon replacing gas cylinders, check couplings using leak spray.  Comment: |
| 🞎 | No noises around gas cylinders and piping/hose systems indicating a leak should be observed.  Comment: |
| 🞎 | Check pressure.  Comment: |
| 🞎 | Check if anything else should be reported in the incident management system.  Comment: |

## Quarterly inspection

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| 🞎 | Check any changes, such as renovations, that may affect the structural condition.  Comment: |

## Annual inspection

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| 🞎 | Perform leak detection of the system using leak spray.  Comment |
| 🞎 | Check that obligatory warning/prohibitory signs are displayed on gas storage and premises where flammable goods are handled – signs must be understandable.  Comment: |
| 🞎 | Check tube marking. Update if necessary.  Comment |
| 🞎 | Inspect hoses, pressure gauges and regulators at outlet posts. In case of wear, replace.  Comment: |
| 🞎 | Review reported incidents and if actions were taken.  Comment: |
| 🞎 | Check LPG product data sheets. Check staff knowledge of handling risks. Check emergency measures to take in the event of a leak or fire.  Comment: |
| 🞎 | Other  Comment: |

## 5-year inspection

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| 🞎 | Replace hoses.  Comment: |
| 🞎 | Conduct tightness control of piping systems by an external inspector.  Comment: |