



WORK PERMIT SYSTEMS

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Prepared by Safety Advisory Council AHG-S.6 Worker Safety

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Amendments to 40/02

Section	Change
All	Complete rewrite of the document

1 Introduction

Reviews of accidents both inside and outside of the industrial gases industry often reveal that at least one of the following causes have contributed to the accident:

- Hazards associated with a task were not adequately identified; and/or
- Appropriate risk prevention measures were not properly identified and/or implemented.

There are many human factors that may increase the likelihood of these outcomes – this is not discussed in this publication but see EIGA’s Human Factor Safety Information publications for more information:

Info HF 02	<i>Individual - "Training and Competence [1]¹</i>
Info HF 04	<i>Task – "Design and Effectiveness of Procedures [2]</i>
Info HF 05	<i>Task – "Maintenance Error [3]</i>
Info HF 07	<i>Organisation - "Communications on Safety [4]</i>
Info HF 08	<i>Task - "Alarm Handling" [5]</i>
Info HF 09	<i>Task - "Fatigue from Working Patterns - Shiftwork and Overtime [6]</i>
Info HF 10	<i>Organisation - "Managing Organisational Change [7]</i>
Info HF 11	<i>Organisation - "Safety Culture [8]</i>
Info HF 12	<i>Task - "Human Factors in Design [9]</i>
Info HF 13	<i>Organisation - "Human Reliability [10]</i>

The use of a work permit system to manage potentially hazardous work tasks (See 3.2.7) should ensure that risk is reduced to an acceptable level. This publication is intended to outline the key elements of a good work permit system.

A fundamental basis of European workplace and worker safety legislation is “risk assessment”. (Health and Safety Framework Directive - Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work [11]).

For normal operating tasks and for foreseeable inspection and maintenance tasks, the employer has a general duty (which in many countries can also be a legal obligation) to provide written operating instructions and to document that sufficient measures are in place so that the risk associated with those foreseeable tasks is acceptable.

In addition to written instructions for normal operations and normal inspection and maintenance tasks, every good safety management system should also include a written work permit procedure to control potentially hazardous tasks.

This publication describes the key elements of a robust work process (management system) to formally manage such tasks under a “work permit”.

It is important to understand that the completed work permit form –that is, the piece of paper -, does not in itself make a task safe; for a work permit system to deliver a safe work environment, everyone

¹ References are shown by bracketed numbers and are listed in order of appearance in the reference section

involved needs to understand how to complete their roles, execute their responsibilities properly, and be trained accordingly. Reference EIGA Doc 924 *Life Saving Rules* [12].

2 Scope and purpose

2.1 Scope

This publication is intended to identify key ingredients and best practices for a work permit system for work performed at an EIGA member company operating site.

The work permit system described in this publication is not intended to meet all requirements of other work situations such as member company employees performing work on customer sites or on construction sites. For a robust work permit system there should be at least two individuals involved together at the work site, the permit issuer and permit receiver. It is EIGA's view that lone workers should not be allowed to write a work permit for themselves.

This publication also only concerns itself with the general work permit. Additional separate procedures and extra authorisations would normally be required for specific high risk tasks such as; confined space entry, hot work, high voltage electrical work or tasks utilising notifiable radiation sources.

See EIGA Doc 44 Hazards of Inert Gases and Oxygen Depletion [13]

2.2 Purpose

This publication provides a general outline of the key elements of a good robust work permit process. It is intended to provide guidance to new/smaller member companies developing their own work permit systems and to provide elements for consideration when reviewing more established work permit processes.

Appendix A includes a list of the elements which EIGA would expect to see included on a company work permit form.

This publication is only a guideline for creating and implementing a work permit process, it is not intended to be the work permit procedure itself.

3 Terminology and definitions

3.1 Publications terminology

3.1.1 Shall

Indicates that the procedure is mandatory. It is used wherever the criterion for conformance to specific recommendations allows no deviation.

3.1.2 Should

Indicates that a procedure is recommended.

3.1.3 May and need not

Indicates that the procedure is optional.

3.1.4 Will

Used only to indicate the future, not a degree of requirement.

3.1.5 Can

Indicates a possibility or ability.

3.2 Technical definitions

Some wording used in this publication is commonly used with different meanings (e.g. risk, permit, control, routine). To be clear within this publication, the intended meaning of the terminology for this document is defined below.

3.2.1 Control

To actively manage the risk. It does not mean to look and check.

3.2.2 Energy isolation (LOTO)

Set of measures which ensure that workers are protected from the consequences of energy release from equipment, machines or installations (whether electrical, chemical, hydraulic, mechanical, thermal, pressure etc.).

3.2.3 Harm

Any injury to people or damage to property or negative impact on the environment.

Harm is the result of a potential hazard actually being realised.

3.2.4 Hazard

Any aspect of the task or the surroundings which has the potential to harm the person performing the task and/or others nearby and/or result in damage to equipment, property or the environment.

3.2.5 Issuer

Person who is authorised to act as the responsible “owner...in control of” the plant area where work is to take place. They are the person who will give permission for work to proceed once appropriate risk prevention measures (safeguards) are agreed and implemented, by “issuing” the work permit.

3.2.6 Normal work

Tasks which are repeated without change in procedure. Normal work presumes that the task is performed in a controlled or unchanging low risk environment by competent workers.

Normal work tasks are discrete and therefore do not require special co-ordination of activities between different groups of workers such as separation in time or space, or additional precautions such as barriers, in order that the work is performed safely.

Normal work tasks shall be managed by means of written instructions and risk assessment in accordance with national legislation and company procedures and do not usually require work permit.

3.2.7 Potentially hazardous work

In this publication, potentially hazardous work is used as an umbrella term for work where there is a (company) mandated requirement or benefit to control the safety of the task under a permit to work, whether or not a written procedure exists. This does not include normal work (see 3.2.6).

Potentially hazardous work could typically include:

- hot work such as welding,
- working at height e.g. erecting/dismantling scaffolding,
- working on live (energised) systems; including breaking into process equipment, line opening, or high voltage electrical switchgear inspections,
- confined space entries such as; internal inspection or repair of a pressure vessel,
- excavation (digging work) and work inside excavated spaces such as trenches,
- override (inhibit) of protective systems; such as fire detection or protection systems,
- hot work in ATEX zoned areas,
- work near or over water where there is a potential for drowning,
- work involving mobile cranes/lifting,
- maintenance involving hazardous materials (e.g. corrosive or toxic substances).

3.2.8 Receiver

Person who accepts the work permit and its conditions in order to perform the work safely himself, or with a team for which he is responsible

3.2.9 Risk

Combination of the probability of the initial event and the severity of the consequence(s) being considered.

3.2.10 Risk prevention and mitigation measures (safeguards)

Measures taken (prescribed) to reduce the probability of any hazardous event occurring and/or to minimise any consequent harm.

NOTE Safeguards can be technical (hardware) or organisational (rules, procedures).

Examples of organisational controls might include; control of ignition sources, atmospheric monitoring, proper energy isolation, lock-out tag-out, stand-by man with fire extinguisher (fire-watch), barricading a work area, provision of safe access for work at height such as scaffolding, and work planning.

3.2.11 Safeguards

See risk prevention measures.

3.2.12 Site manager

Person who has overall duty and authority to ensure that the company work permit system is implemented and effective at the site.

3.2.13 Task performers

Group of workers under the control of the permit receiver who work with them to complete the work authorised under this work permit.

3.2.14 Task risk assessment

An assessment of the hazards of each step of a task, including the required safeguards. This is the responsibility of the employer who is “expert” in that task. A task assessment will usually be limited to the task itself and therefore would not identify and address hazards from the surroundings, but should include any recovery from emergency situations associated with the task, for example exiting from an excavation.

Sometimes very generic task risk assessments are provided by contracting companies, which list all possible external hazards but are not specific to a particular work environment.

Where external companies are contracted because they are the experts in a specific task, then the task risk assessment should be provided by the contractor and used as an input to the process.

3.2.15 Work permit control centre

Single nominated location where copies of open permits are available, in order that plant operation teams have a clear overview of work in progress.

3.2.16 Work permit or work permit form

Document used to identify the work being authorised, the potential hazards and required safeguards. It shall be reviewed by the work permit issuer and work permit receiver before being signed and issued.

The company should develop a form which adequately structures and documents the identification of hazards, potential consequences and precautions required so that the work can be performed safely.

Conceptually the form may be paper or electronic, but it is fundamental that a legally-recognised signature is added by the permit issuer.

3.2.17 Worker

Company employees as well as contractors. It includes supervisors and all levels of management. See also EIGA Doc 118 *Safe Management of Contractors* [14].

3.2.18 Workplace risk assessment

Task risk assessment documented for task being performed in a specific workplace. This should include any recovery from emergency situations associated with the task, for example recovering an injured person from a high-level platform.

4 Requirements of a work permit system

The objective of a work permit system is to ensure that potentially hazardous work on industrial gas company installations can be carried out safely. The company work permit system should be described in a procedure.

The procedure should describe; the steps required to prepare, issue and close a work permit, the training requirements for various roles, including competence assessment of authorised permit issuers, the requirements for information and equipment to be available at the work permit control centre, as well as document retention requirements.

4.1 When is a work permit required?

The company procedure shall define that a work permit is required for potentially hazardous work (see 3.2.7) and not for normal work tasks (see 3.2.6).

It is considered best practice that the company procedure clarifies that a work permit is absolutely mandated for some types of work and these should be listed in the procedure.

It is considered good practice for the company procedure to require the plant manager to document tasks with low or “insignificant” risk that do not require work permit at their site. An example could be cutting grass away from process areas of an air separation plant.

Work permits should be used to manage the risks of the interface between a task, its surroundings and any time-based changes.

Normal work which is suitably documented in accordance with company procedures and national legislation would not usually be also subject to work permit if performed in a controlled environment and by workers familiar with the site. The same tasks, if performed in potentially hazardous areas for example, in an ATEX-zoned area or during a plant shutdown or by workers not familiar with the site, could require a work permit.

Different teams (employees, contractors, service providers) working in close proximity and the potential effect that their activities can have on each other can create the need for a work permit to reduce the risks from interference.

4.2 Identified roles and responsibilities in the work permit procedure

NOTE: Local regulations may require formal qualifications for certain roles in the work permit process.

4.2.1 Work initiator or planner

The work requiring a work permit can often be planned some time in advance. It could be initiated as a result of a project, a scheduled shutdown, site improvement or maintenance. This reduces the workload of the permit issuer when the permit is to be issued before the work is to be started.

The work planner or initiator should ideally engage with a work permit issuer at an early stage when planning for large or complex tasks.

4.2.2 Energy isolation preparer

Other company procedures shall outline the competence of persons responsible for safe isolations of equipment.

4.2.3 High voltage electrical isolation preparer

Other company procedures shall outline the competence of persons responsible for safe isolations of high voltage electrical equipment. This is not usually the work permit issuer.

4.2.4 Work permit issuer

The work permit issuer shall be a trained, competent and formally authorised employee. They shall be responsible for ensuring that the outlined work can be performed safely.

The work permit issuer must satisfy himself that all adequate isolations and other safeguards are in place and effective. The permit issuer can delegate actual preparations such as isolations and placing barricades, but they always retain the responsibility.

If the issuer is not an expert in certain technical aspects then they could need to engage additional specialists to assure that appropriate precautions are identified and in place for high risk tasks such as high voltage electrical work, confined spaces and lifting operations.

The permit issuer shall visit the job site with the permit receiver before they sign and issue the work permit.

The permit issuer should be available on site (not necessarily at the work permit workplace) for the duration of the work permit. If they need to leave site, they shall first delegate their responsibilities to another competent, authorised person. This authorisation and delegation should be defined in the company procedure.

The permit issuer is accountable for periodic observations of the work in progress to ensure compliance with agreed permit conditions. (See 5.10).

The permit issuer is responsible for final checks of the work area and proper close out of the work permit.

4.2.5 Work permit receiver

The person who engages with the permit issuer to agree safe work conditions. They are responsible for describing to the permit issuer how the planned work is to be performed and the associated task hazards so that together they can agree appropriate precautions. Part of this discussion shall occur at the work place immediately before the permit is issued. The permit receiver shall sign the permit to formally record their agreement with and acceptance of those conditions.

The permit receiver shall contact the permit issuer if there are any significant changes to the planned work scope, method, hazards or conditions.

If the work permit receiver is working alone they are also the task performer.

If a team of people is working with the work permit receiver to perform the task, then the work permit receiver is their leader/supervisor and he is responsible for explaining the work permit conditions to all of the other task performers and ensuring that they follow the conditions of the permit.

The permit receiver shall remain on site for the duration of the work permit. If they need to leave site, they shall first hand over receiver duties to another receiver in discussion with the responsible permit issuer.

The permit receiver is responsible to ensure that the work area is put in a safe and tidy state whenever they or their team leave the work area. When the work is complete the permit receiver should review the work with the permit issuer as part of the work permit closure.

4.2.6 Task performer

The task performer can be one or more individuals who actually perform the work. The task performer can be a contractor or employee. If there is a group or team of task performers their leader or supervisor is the work permit receiver. All task performers shall be aware of and obey the permit conditions.

The task performers are responsible to advise the permit receiver promptly if there are any changes to the planned work scope, method, hazards or conditions.

4.2.7 Site manager

The site manager is the person who has overall duty and authority to ensure that the company work permit system is implemented and effective at the site. In order to achieve this there should be company systems in place to review and audit [15] the effectiveness of issued work permits. (See 5.10).

The company procedure shall make it clear who is responsible for assessing the competence of work permit issuers and who shall authorise competent work permit issuers at each site.

4.3 Requirements for training (in the work permit procedure)

The company work permit procedure shall outline the training requirements.

4.3.1 General awareness training for employees

All employees working on operating sites should receive basic awareness training about work permits and the importance of isolation procedures.

4.3.2 Permit receiver and task performers – work permit training and competence

All task performers (employees and contractors) shall have an understanding of the basic elements of their role in the company work permit procedure.

Note that the employer of the task performers is responsible to ensure that the task performers are competent to perform the actual work (that is trained in the relevant craft or trade). If the task performers are contractors, then the employer should be able to provide evidence of this competence to the permit issuer. (See 4.6.)

4.3.3 Permit issuers

Permit issuers need to be trained in the work permit system and specifically in their role as permit issuer. The permit issuer should also have sufficient training and experience to be able to; identify hazards in the work place, to review task risk assessments including the definition of protective or mitigating measures (safeguards), to have a good appreciation of specific safeguards such as energy isolation (LOTO) and to refer to other relevant company procedures.

It is considered best practice that the competence of potential permit issuers is formally assessed and recorded as part of their "authorisation" by the site manager. The site manager shall be satisfied that

the work permit issuer is aware of their own limitations and that the permit issuer shall engage additional specialists when needed. Otherwise the site manager should limit the authority of the new permit issuer to certain types of work.

4.3.4 Site manager

The site manager shall be given sufficient training and information to appreciate and properly complete their responsibilities. The site manager could previously have been trained as a work permit issuer, but this is not a requirement of the site manager role.

4.4 Work permit process steps

The company work permit procedure should describe in detail how to operate and manage the individual steps of a work permit process. These steps are detailed in Section 5. of this document.

When developing or reviewing the management policy for work permitting, the following points should be considered:

4.4.1 Preparation

The company work permit procedure should:

- Underline that good preparation is key for safe and effective permit issuing. See 5.2.
- Set out the possible information pathways to communicate the intended work scope to the permit issuer, noting that there may be different approaches for simple repair work or for major work such as; maintenance activities during shutdown, large projects etc. See 5.2.
- Describe when an external contractor or an internal team is to provide a task or workplace risk assessment and the desired level of detail. See 5.3 and 5.6.

4.4.2 Issue

The company work permit procedure should emphasize that it is a requirement for the permit issuer and the permit receiver to visit the job site prior to issuing the permit. It is considered good practice for the company procedure to include an explanation of the importance of this step (see 5.5 and 5.8).

4.4.3 Execution of work

The company work permit procedure should define instructions for managing original and copies of ongoing work permits and associated documents until their closure and archiving, including which documents should be available for inspection at the worksite. See 5.8.

4.4.4 Monitoring

The company work permit procedure should define whether and how informal monitoring should be documented. See 5.10.

4.4.5 Closing, cancelling, suspending, revalidating

The company work permit procedure should:

- Describe the steps required for work to continue safely after either a “false” alarm or in the event of a major emergency. See 5.11.
- Define the validity of a work permit.
- Explain handover to allow for exchange of permit issuer or permit receiver. See 5.9 and 5.11.4.
- Outline the steps to ensure that the equipment and area is left safe, as well as how the work permit or other documents should reflect the situation when work cannot be completed within the duration of the original permit. See 5.11.1. In some cases, the company may require that the original permit is closed, and a new permit would be required on return.
- Where the company procedure allows for multi-day or multi-shift permits, then the steps required to “suspend” the permit, for example overnight if work is not yet complete - should also be clearly described (see 5.11) and reflected in the permit form design.
- Outline the steps required to close out a work permit when the described work is finished. See 5.11.

4.4.6 Work permit form (design)

The company work permit form should be a controlled document. It should be included in or referenced from the company work permit procedure. The form design should guide the issuer and receiver through the different steps of the process.

Appendix A has a list of the information fields that are recommended to be included on, or covered by the permit to work and related forms.

4.5 Work permit control centre

It is best practice to have a defined location for issuing work permits at each site. This enables effective cross-check of other ongoing work as each permit is issued. The work permit control centre may be a dedicated room, or may be an area for example within the plant control room.

Open permits shall be clearly displayed or readily accessible in a defined location at the work permit control centre.

The company procedure may specify what information should be held or be available in the work permit control centre. Such items may include; display of open permits, list of authorised permit issuers, list of work exempted from work permit, site map or plot plans.

4.6 Demonstration of (certificate of) competence

The company work permit system should describe when evidence of training/competence in the task to be performed shall be provided and give guidance on how that duty is to be fulfilled.

For some roles, such as crane drivers or pressure systems welding or electrical work on ATEX equipment, a certificate may be required by national legislation and then the verification is a simple check that the certificate is valid (still in date).

The company procedure shall define who is responsible for checking certification or competence and described how the permit issuer is informed that it is in place if the check is achieved by others.

4.7 Suspension of permits during alarm

In the event of a site alarm (emergency or false alarm) all work under work permits must be suspended at least until the emergency controller declares "all clear". It is considered good practice for the emergency controller and work permit issuer(s) to work together to determine what steps are required for work to continue safely.

It is considered good practice for the site induction also to explain this process.

4.8 Monitoring, auditing and review of effectiveness of work permit system

4.8.1 Monitoring (assessment and coaching)

In order to ensure that the work permit process is operating effectively and to the correct standard, the company work permit procedure should include a requirement for the site manager to ensure that the work permit process is occasionally monitored. This should include checks of documentation, observation of the work permit process and/or observation of the locations where work permits are being used.

Different levels of monitoring may be performed by employees, work permit issuers, or site managers.

The scope, responsibility, frequency and requirements for different types of monitoring should be described in the company work permit procedure.

The results should be used for coaching and feedback on the performance of permit issuers and effectiveness of the work permit process.

4.8.2 Auditing

The work permit process is a key lifesaving management system [12] and therefore shall be audited as part of the safety management system in order to evaluate and assure the effectiveness of the process.

Such audits shall be performed by trained and competent auditors and are described in detail in Doc 102 *Auditing Guidelines* [15].

4.8.3 Work Permit system review

It is good practice that the company work permit procedure includes a requirement to review the effectiveness of the work permit system at a site level.

It is recommended that there is a periodic self-assessment [15] of the results of monitoring and audit activities, to identify any issues and trends in the work permit process and to determine if improvement is needed to the system or to the implementation of the system.

Any issues (positive or negative) found during these reviews should be used to direct the training/re-qualification or competence assessment of all personnel involved in the work permit process.

This review of the work permit system may be performed by the manager of permit issuers on the site or by the site manager, depending on the size and organisation on the site.

4.9 Document retention requirements

The company work permit procedure should specify a period of time for retention of completed work permits and associated paperwork in order to provide a sufficient sample size to facilitate audit and review. It should also describe who is authorised to dispose of old permits after this period. National legal requirements regarding document retention must also be followed.

The company shall also define any prolonged retention requirement for work permits and associated paperwork related to any accident or incident. This should be included in the company work permit procedure and may also be in other formal procedures (for example incident investigation or document archiving procedures).

5 Work permit process (description of steps to prepare, issue and close work permits)

The steps required to issue, manage and close a work permit are described in this section.

Although the steps required to prepare and issue a permit are described as discrete work steps here, in practice a lot of this work happens at the same time.

It is considered good practice to pre-plan work so that a permit issuer can start to fill in the work permit form well before work permit receiver arrives on site.

5.1 Work scope

For work to be safely managed, the permit issuer shall understand:

- What work is to be performed.
- How that work is to be carried out;
- By whom that work is to be carried out;
- Exactly where and when it will be performed; and
- What is not included in the scope.

Documents which can help as an input to determining the work scope can include the procurement order and contractor's price quote (e.g. for a contractor to build or repair equipment at site) or internal work procedures, for example, for annual inspection of a pump.

If internal work procedures for these inspection/maintenance tasks exist, they will provide useful information input to the permit issuer.

5.2 Preparation: compile and assess information

This stage can be time consuming and/or complex, so it is best practice for the permit issuer to be made aware of intended work and provided with relevant information, several days in advance.

Adequate preparation time will better enable the permit issuer to:

- Obtain all available information, including work outline and if applicable; the task risk assessment (see 5.3), current safety data sheets (SDS), accurate Piping & Instrumentation Diagram (P&ID) (especially for Lock Out Tag Out requirements), single line diagrams and other technical drawings.

- Go and look at the work location, (this visit could be done with the contractor as part of planning discussions several days prior to job).
- Assess the information, especially to identify possible hazards and undesired outcomes.
- Decide whether a work permit is required.
- Challenge whether the work as proposed could be performed in a safer manner.
- Consider which additional technical or organisational safeguards he might specify on the permit.

So that they can conclude that the work as outlined can be performed safely enough under work permit, or requires an alternative task methodology.

5.3 Preparation: task risk assessment, identification of hazards, risks and safeguards

It is best practice for the company to require that contractors submit their task risk assessment in advance of work to be performed.

European directives require that the company should have documented task risk assessments for normal work activities performed by its own employees at various locations. For most normal work activities, a work permit would not be required.

However, even for normal work tasks with task risk assessments; where that task is to be performed in a potentially hazardous location (e.g. ATEX zones, confined space or excavation) or when there is an interaction with other work such as during a shutdown, then a work permit may be required to manage the interface of these activities. In these cases, the task assessment should also be presented to the permit issuer, in advance of work to be performed.

The task risk assessment documents the hazards of the work steps and should be assessed and understood by the permit issuer, so that he can:

- Reflect the identified task hazards and existing safeguards in the work permit;
- Consider the how hazards from the proposed work location could impact the safety of the proposed task;
- Assess the workplace hazards (for example, traffic, process vents, or weather) and define additional safeguards (barricades, isolations and PPE) in the work permit requirements.
- Plan and provide any equipment needed for recovery from emergency situations associated with the work.

If the task risk assessment is not available, see 5.6.

A permit issuer may refuse to issue a work permit if a task risk assessment is not available for a complex task outside the experience of the permit issuer.

The competence of the permit issuer to understand and assess the task risk assessment would normally be addressed in permit receiver and permit issuer training.

Collection of information about the intended work, such as technical drawings, (see 5.2) will allow the permit issuer to fully assess the hazards and risks and therefore identify all appropriate control measures.

Control measures should be defined in a timely manner and be in place before the permit is issued. Control measures that can take time to implement include; draining, cleaning, defrosting and purging

of process equipment, as well as equipment isolation. There may also be practical steps in terms of ensuring that appropriate tools, barricades and access equipment are available on site.

Depending upon the design of the company work permit form, either:

- A hazard identification and definition of required control measures shall be included in the work permit form. The form itself then satisfies the need for a risk assessment for simple or straightforward tasks, or
- the risk assessment shall be attached.

5.4 Implement required equipment Isolations

It is crucial that the permit issuer always uses master data (especially master P&IDs, current safety data sheets) for the basis of defining required isolations and safeguards

It is important for the permit issuer to ensure that people performing work are protected from all energy sources. This is usually achieved in an operating facility by an energy isolation procedure (also known as Lock Out Tag Out). In essence this should:

- Use up-to-date P&ID flow sheets to identify relevant potential energy sources (e.g. pressure energy, chemical or thermal energy) and appropriate isolating devices such as ; , spool pieces, blinds, double block and bleed valve arrangements etc.
- Use electrical drawings (single line diagrams) to determine best isolations for power and instrument electrical supplies and define appropriate electrical isolations such as fuses, breakers, and supply cut-off.
- Lock isolating devices into the "safe" position in order to prevent re-energisation.

See BS EN 1037:1995+A1:2008 *Safety of machinery. Prevention of unexpected start-up* [16] and HSG253 *The safe isolation of plant and equipment* [17].

5.5 Pre-job discussion (permit issuer and permit receiver) at the job site

It is important that both the permit issuer and permit receiver visit the job site together on the day the work is to be carried out. The purpose of this mandatory visit is to allow both to have a clear understanding of the conditions at the job site to identify any hazards that were not identified in the initial risk assessment, and to identify any additional risk arising from any interfaces or interference between the job site and the surroundings on that day. The visit should be carried out as close as possible to the start time of the work, or it shall be confirmed that conditions have not changed.

It is important to clearly identify the equipment that is to be worked on to eliminate any doubt or confusion, for example, location of equipment, identification numbers of equipment or valves etc., should be identified and cross-checked.

At the job site:

- The permit receiver should outline to the permit issuer his understanding of what work is to be carried out and describe the processes and steps that will be followed.
- The permit issuer and the permit receiver should identify the sources of the hazards listed in the risk assessment.
- The permit issuer and permit receiver should discuss all the risks identified; agree on precautions to be taken to mitigate these risks; discuss what else could go wrong and define actions to be taken in the event of an emergency.

5.6 Complete the form (work description, hazard identification, precautions)

When completing the permit to work form a brief but specific description of the task(s) to be performed and equipment involved should be given.

The completed permit to work form should fully define the safeguards to be taken as identified in the risk assessment and pre-job discussion. At least one safeguard should be implemented for each hazard identified.

Any actions specific to the work that should be taken in the event of an accident, incident or emergency and that are not already included in the site emergency plan, should be documented in the permit to work form or related documents (for example, rescue procedures for working in confined spaces or at height).

5.7 Communication with others who may be affected by the work

All operators or maintenance workers who could be working on the equipment, or could be affected by the work, shall be made aware that the task is about to begin.

They shall be made aware of any additional hazards and risks that have been introduced by the work to be carried out under the permit to work, as well as the safeguards to be put in place.

This may be achieved by briefings at shift start or handover, tool box briefings etc. The permit is often issued in the control room and posted on a control board. The means of communication will depend on the site population and complexity.

5.8 Issue work permit and post at permit control centre

The permit issuer must then check all other open work permits and ongoing site work activities in the area, for potential safety interactions with the planned permit work.

Where applicable, they should ensure that all equipment isolations and locks have been installed and are identified as defined in the company LOTO standard.

When these checks are complete the permit receiver shall sign the permit to confirm their agreement with the documented safeguards. The permit issuer shall also sign the permit and place it in the prescribed location for open permits. It is good practice to provide a visual display of all the permits that are open at any time.

An issued permit means that the equipment has been made safe for work to commence, identified precautions are in place, identified risks are under control and specific emergency actions have been defined.

5.9 Execution of the work at job site

The permit receiver and the team under his direct supervision can now commence work. A copy of the permit shall be kept at the job site while the work is in progress, it should be readily accessible and where possible visibly displayed.

The permit issuer and permit receiver shall be available on site or their responsibilities transferred in accordance with 4.2.4 and 4.2.5. This transfer shall be recorded, either on the permit to work form or in another identified document or record such as a shift log book.

5.10 Work permit compliance checks (supervision and monitoring)

Whilst the task is in progress, the permit issuer should (and other employees can) check that those performing the task are meeting the documented work permit conditions, verify that safeguards are maintained in place, the surrounding work conditions have not changed and work is proceeding as planned.

The frequency of checks will depend on a number of factors including the risks identified and the experience of those carrying out the work.

Work permit compliance checks can provide an opportunity for positive reinforcement of safe work.

Checklists may be used to assist with these permit compliance checks.

Where there is a safety concern about how the work is being performed, then action to pause or stop the work should be taken immediately and the permit issuer and permit receiver should discuss the issues.

5.11 Closing, cancelling, suspending or revalidating of the permit

5.11.1 Closing work permit - work complete

When the team has completed all of the planned work and tidied the area, the permit receiver should meet the permit issuer at the job site and confirm satisfactory completion of the work, that waste is properly disposed of and the area is left clean, safe and tidy. At this point the permit receiver, if required by company standards, can “sign-off” the work permit. Finally, the work permit issuer shall “sign-off” the work permit as closed.

After the work is complete and the permit is closed, then isolations may be removed and equipment re-energised.

5.11.2 Revalidation/suspensions of work permit - same work ongoing, discontinuous

If the work continues over more than one day (or shift) and if allowed by company procedure, then the same work permit may be suspended (for example, overnight) and revalidated at the start of the next work day/shift (work period). In this case the permit is not closed at the end of the first work period.

At the end of the work period, the permit receiver is responsible for leaving the work area in a safe state and recording that his team has stopped work on this job at a specified time. The permit issuer is responsible for completing documentation to show that the work is incomplete and permit is suspended from that time. Suspended work permits should be clearly displayed in the control centre.

At the start of the next work period (for example, on the next day) both the permit issuer and permit receiver should revisit the work site and confirm; all isolations are still effective, the work plan and work conditions (including, for example, weather) are unchanged and the precautions agreed previously are still valid, appropriate and effective. Minor amendments may be allowed by company procedure at this stage. If the work conditions and precautions are still valid then both the permit receiver and the permit issuer sign to revalidate the work permit. If there are significant changes then clearly a new permit must be written.

It should be clear at any point in the suspension/re-validation work process if the permit receiver and his team are actually working in the field or if they have left the site or work area.

5.11.3 Work permit closed or suspended - work incomplete

If the work is stopped before the work is fully complete, for example, if a replacement part is needed, then the permit receiver and permit issuer shall visit the site and agree how to leave the equipment in a safe state until the remaining work can be completed (possibly several days or weeks later).

The isolations required to keep the “disabled” equipment in a safe state whilst waiting for the part, shall be reviewed and possibly amended. It should be obvious in the field, in the control room and by looking at the energy isolation (lockout tag out) register what the status of this “disabled” equipment is.

In this case the work permit may either be closed or suspended based on company procedure. If the original work permit is closed, then a new permit shall be written for the remaining work. If the original permit is suspended, and within duration defined in company procedure, then it shall be revalidated for remaining work.

5.11.4 Handover of responsibilities - same work ongoing, continuous

It is recommended that for a change in permit receivers, the responsible permit issuer will re-visit the work area with the incoming permit receiver to ensure consistent understanding.

Any incoming permit issuer and/or incoming permit receiver shall understand and agree to the work conditions and safeguards before signing on to the existing permit.

5.11.5 In event of site alarm - suspension

In the event of a site alarm all work permits are suspended with immediate effect.

After the end of the “emergency”, the emergency controller shall decide, based on their understanding of what actually happened and in discussion with the permit issuers whether:

- It is safe for everyone to return to work (for example, after a false alarm). In this case all work permits are re-activated provided that all prescribed safeguards are still effective.
- Some or all permit receivers shall return to the permit control centre and each permit shall be reviewed by the permit issuer, checked and revalidated before the task performer team returns to work.
- All permits are cancelled and each permit must be completely re-written before work re-starts. This can take a significant amount of time but can be necessary for example after a fire.

6 References

- [1] Info HF 02 *Individual - "Training and Competence"*. European Industrial Gases Association. www.eiga.eu
- [2] Info HF 04 *Task – "Design and Effectiveness of Procedures"*. European Industrial Gases Association. www.eiga.eu
- [3] Info HF 05 *Task – "Maintenance Error"*. European Industrial Gases Association. www.eiga.eu
- [4] Info HF 07 *Organisation - "Communications on Safety"*. European Industrial Gases Association. www.eiga.eu
- [5] Info HF 08 *Task - "Alarm Handling"*. European Industrial Gases Association. www.eiga.eu
- [6] Info HF 09 *Task - "Fatigue from working patterns - Shiftwork and overtime"*. European Industrial Gases Association. www.eiga.eu

- [7] Info HF 10 *Organisation - "Managing Organisational Change"*. European Industrial Gases Association. www.eiga.eu
- [8] Info HF 11 *Organisation - "Safety Culture"*. European Industrial Gases Association. www.eiga.eu
- [9] Info HF 12 *Task - "Human Factors in Design"*. European Industrial Gases Association. www.eiga.eu
- [10] Info HF 13 *Organisation - "Human Reliability"*. European Industrial Gases Association. www.eiga.eu
- [11] Health and Safety Framework Directive - *Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work*. European Union OJ L 183, 29.6.1989, p.1.
- [12] Doc 924 *Life Saving Rules*. European Industrial Gases Association (Members only). www.eiga.eu
- [13] Doc 44 *Hazards of Inert Gases and Oxygen Depletion*. European Industrial Gases Association. www.eiga.eu
- [14] Doc118 *Safe Management of Contractors*. European Industrial Gases Association. www.eiga.eu
- [15] Doc 102 *Auditing Guidelines*. European Industrial Gases Association. www.eiga.eu
- [16] EN 1037 BS EN 1037:1995+A1:2008, *Safety of machinery. Prevention of unexpected start-up*. British Standards Institute, London, United Kingdom. www.shop.bsigroup.com
- [17] HSG253. *The safe isolation of plant and equipment*. 2006. ISBN: 9780717661718. Health and Safety Executive, United Kingdom. www.hse.gov.uk

7 Additional references

HSG 250, *Guidance on permit-to-work systems: A guide for the petroleum, chemical and allied industries permit to work*. 2005. ISBN:9780717629435. www.hse.gov.uk

Appendix A – List of elements

A1: Recommended elements of Work Permit form

ELEMENT (field name/ name of Box on company work permit form)	<i>Explanation of Element</i>
Own company name/logo	
Work permit number	<i>Unique alpha-numeric reference</i>
Issue date and time	<i>When permit is authorised/becomes valid</i>
Duration of permission/validity	
Name and signature of Permit issuer	
Name and signature of Permit receiver	
Receiver worker's company name	<i>If receiver is not company employee</i>
Total number of workers	<i>Including receiver. Can supplement with list of names</i>
Site name	
Work location	
Equipment identification: Tag number or name/description	<i>Exact enough to correctly identify equipment to be worked on</i>
Description of work to be performed	<i>To <u>precisely</u> define work scope that is allowed.</i>
Hazard identification / risk assessment (e.g. pressure, cryogenics, hydraulic, mechanical, electrical, steam, oxygen enrichment, chemicals, traffic)	<i>Identify and document relevant hazards from area and task, consider risk/consequences in order to identify safeguards (see next element). See 5.3.</i>
Agreed safeguards including energy isolation.	<i>Determine and record appropriate safety measures discussed and agreed with Receiver. See 3.2.8 and 5.3.</i>
Confirmation that all listed safeguards are in place	<i>General confirmation is needed for the permit to be issued, detail may be on supplementary sheets. See also A2 for process isolations.</i>
Cross – reference other work in the area	<i>Either listing permit number or description of other work activities nearby. See 5.3.</i>
Confirmation Issuer and Receiver visited the job site today	<i>Pre-job visit, before permit is issued. See 5.5.</i>
Confirmation of pre-job discussion	<i>Review/discussion of safeguards informed by pre-job visit</i>

ELEMENT (field name/ name of Box on company work permit form)	Explanation of Element
Required PPE	<i>Combination of site required PPE for work area and task-specific PPE</i>
Required safety equipment (flashlight, barricades, area lighting)	<i>Individual or collective protections which are not "PPE".</i>
Requirement for atmospheric monitoring	<i>Gas measurements to be recorded – results may be on supplemental pages</i>
Handover of responsibilities (permit issuer and / or permit receiver)	<i>IF Issuer and/or Receiver leave site or across shift changes, when allowed by company work permit procedure. See 5.11.4.</i>
Extension / re-validation	<i>As allowed by company work permit procedure. See 5.11.2.</i>
Suspension / cancellation	<i>e.g. in event of site alarm. See 5.11.3 and 5.11.5.</i>
Closeout – when work is complete	
Status of equipment / area at end of permit	<i>See 5.11.1</i>
Other special permits necessary	<i>e.g. Hot work, confined space, excavation which required extra authorisation before safety work permit is issued. See 2.1.</i>

A2: Additional elements on or attached to Work Permit form

ELEMENT (field name/ name of Box on company work permit form)	<i>Explanation of Element</i>
Names and signatures of all participants to pre-job discussion	
Compliance checks (monitoring of work activity)	<i>When required by company work permit procedure; evidence of visit/review in the field by permit issuer or other company employee. See 5.10</i>
Tools allowed to be used (hand tools, electrical tools, ladders)	
Required process isolations	<i>Includes confirmation that isolations are in place</i>
Personal locks installed/removed	<i>When required by company work permit procedure or national legislation or regulation.</i>
Permit document check completed (after closure)	<i>Associated documentation (isolation register, MOC, special permits)</i>
Risk assessment	<i>See 3.2.15 and 3.2.20</i>
Method statement	
Other special permits (e.g. high voltage, hot work, confined space, radiation work, excavation, lifting, mechanical and electrical)	<i>See 2.1.</i>