

HEALTH & SAFETY

Safety Code of Practice: Pressure Systems

US
UNIVERSITY OF
SUSSEX
BRIGHTON

Executive Summary

A Safety Code of Practice (SCoP) is a university-wide document that supports policies to provide detailed practical information on how to ensure compliance with relevant laws, standards, and regulations, and must be followed by all Faculties and Divisions.

SCoPs are supplemented by associated Guidance documents, which provide additional advice and information on specific topics and are intended to assist in the development of local procedures.

This document is the fifth in the Safe Management of Equipment C300 series of SCoPs and is intended to support managers and teams in drawing up local operational documents.

Health, Safety & Wellbeing, HR Division

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1. Introduction

A pressure system is defined as a system comprising one or more pressure vessels, associated pipework and protective devices that contains, or is liable to contain, a relevant fluid at a pressure greater than 0.5 bar above atmospheric pressure. Relevant fluids include compressed air, industrial and laboratory gases, steam, pressurised hot water and refrigerants.

Pressure systems can include things such as:

- Boilers and steam heating systems
- Pressurised process plant and associated pipework
- Compressed air systems (fixed and portable)
- Pressure cookers, autoclaves and retorts
- Heat exchangers and refrigeration systems
- Valves, pressure relief devices, steam traps and filters
- Pipework and hoses
- Pressure gauges and level indicators
- Steam coffee machines and similar catering equipment

In laboratory and research environments, pressure systems may also include gas cylinder installations and manifold systems, pressure reactors, autoclaves, Schlenk lines, chromatography equipment, fermentation systems, cryogenic vessels, pneumatic test rigs and other experimental apparatus designed to operate under pressure or connected to pressurised gas supplies.

If not properly managed and things go wrong, these types of equipment can cause serious injury and even fatalities due to impact from the blast of an explosion, impact from parts of equipment that fail, flying debris, contact with released liquid or gas, and fire resulting from the escape of flammable liquids or gases. However, by ensuring that the risks are assessed and precautions are implemented, the chances of accidents occurring can be minimised.

This Safety Code of Practice (SCoP) explains what Faculties and Divisions need to do to meet their moral and legal obligations under the Pressure Systems Safety Regulations 2000 (PSSR), by identifying pressure equipment that they are responsible for, carrying out a risk assessment of such systems, implementing measures to reduce the risk of incidents, ensuring a Written Scheme of Examination (WSE) is created where required, and that statutory inspection and ongoing maintenance of such systems are undertaken and recorded.

2. Scope

This SCoP applies to all University employees, postgraduate researchers, students, visiting researchers, contractors, consultants, visitors and any other persons who use, manage, maintain, install, modify or otherwise work with pressure systems on university controlled premises or as part of University managed activities.

The requirements of this SCoP apply across all relevant University operations, including but not limited to:

- Teaching and research laboratories

- Workshops and technical facilities
- Plant rooms and engineering infrastructure
- Estates and maintenance activities
- Construction and refurbishment projects
- Catering and hospitality operations
- Any other area where pressure systems are installed or used.

Third parties and contractors who carry out activities that involve the use of pressure systems on University premises are required to co-operate and co-ordinate with the University, comply with relevant legal requirements, and provide evidence of appropriate inspection, maintenance, examination and competence where requested.

This SCoP does not apply to the University's facility management company, Sussex Estates and Facilities (SEF), who are responsible for identifying, assessing, examining, maintaining and managing pressure systems that they are responsible for, and those where the FM contract details that the University has handed over such systems to SEF for ongoing management. However, Faculties and Divisions must cooperate with SEF where shared responsibilities exist and ensure that any locally controlled pressure systems remain managed in accordance with this SCoP.

3. Definitions

Competent person – an individual or organisation with sufficient knowledge, experience and independence from operational pressures, to carry out examinations and assessments under PSSR, and to make objective decisions.

Compressed gas cylinder – a transportable pressure receptacle designed to contain gases under pressure, including compressed, liquified or dissolved gases.

Gas manifold system – an arrangement of connected gas cylinders, regulators and pipework designed to distribute gas to one or more points of use.

Maximum allowable pressure (MAWP) – the maximum pressure for which the equipment is designed.

Owner – the person that a mobile pressure system belongs to, where a user hasn't been appointed. For example, mobile air compressors, pressure washers and mobile air receivers.

Pressure equipment – any vessel, pipework, protective device, gauge, fitting or other component that forms part of a pressure system.

Pressure relief device – a protective device that automatically releases a relevant fluid to prevent overpressure.

Pressure systems – a system comprising one or more pressure vessels, associated pipework, protective devices and controls, and containing a relevant fluid.

Pressure vessel – a container designed to hold fluids under pressure, including receivers, cylinders, tanks, and separators.

Protective device – a device designed to prevent system limits being exceeded (e.g. pressure relief valves, bursting discs, high-pressure cut-out systems).

Relevant fluid – a relevant fluid is steam at any pressure; compressed or liquified gas, including air, at a pressure greater than 0.5 bar above atmospheric pressure; pressurised hot water above 110°C; or a gas dissolved under pressure in a solvent.

Safe operating limit (SOL) – the maximum or minimum pressure, temperature or other parameter beyond which the system must not be operated.

Schlenk line – a laboratory apparatus consisting of interconnected vacuum and inert gas lines used for handling air and moisture sensitive substances. Schlenk lines may present pressure, vacuum, chemical exposure and asphyxiation hazards.

User – the person who has control of operation of the pressure system. In terms of this SCoP, this is most likely the Faculty or Division.

Written Scheme of Examination (WSE) – a documented scheme specifying parts of the system to be examined, the nature and frequency of examinations and the preparations that are required.

4. Responsibilities

4.1 Executive Deans of Faculty and Directors of Professional Services

For installed pressure systems, the University is the User for the purposes of PSSR. Executive Deans and Directors discharge these responsibilities on behalf of the University within their Faculties and Divisions, delegating tasks as appropriate. Therefore, Executive Deans of Faculty and Directors of Professional Services are responsible for making sure that there is a safe system of work in place to ensure that:

- All pressure systems under their control are identified and notified under the University's [Insurance Engineering Inspection Process](#), so that a competent person can review the system.
- Pressure systems under their control are listed on a local inventory, with details of the examination due date and details of the person with day-to-day oversight of the system.
- Any pressure systems designed in-house are done so by a competent person and that the requirements of PSSR have been met through the design process.
- Pressure systems are installed by a competent person who is familiar with the requirements of the PSSR.
- Risk assessments are undertaken of the identified systems, which are reviewed periodically or sooner if there is a change to the system or its use.
- Adequate resources are available for the design, procurement, build, installation, ongoing maintenance, statutory examination, inspection, repair, modification, safe disposal and record keeping relating to pressure systems under their control.
- Written Schemes of Examination are written, reviewed, and implemented by a competent person through the University's insurance provider.
- Staff and others are prevented from using pressure systems that have not been examined by the date specified in the most recent examination report.
- Defects that are highlighted as potentially causing imminent failure of a pressure system are addressed promptly, and that the pressure system is taken out of use in the interim.

- Safe operating limits are established and these and other information about the pressure systems are communicated to those who need to be aware.
- Staff and others are prevented from using pressure systems until the safe operating limits have been established.
- Suitable operational procedures and emergency arrangements are in place for pressure systems and that these are communicated and tested periodically.
- Pressure systems are not operated outside examination dates or safe operating limits.
- Suitable maintenance and inspection programmes for the pressure systems under their control are implemented, and actions from these are addressed.
- Modifications and repairs to existing pressure systems are undertaken by competent personnel, to ensure that statutory requirements are followed, which may be from a competent contractor where the competence does not already exist within the University community.
- A logbook is kept for each pressure system under their control that contains records about the system design and parts of the system including the written scheme of examination, examination reports and any other documents relating to the system's safety, such as details of abnormal operating conditions.
- Precautions are put in place to prevent the pressurisation of vessels which have a permanent outlet to atmosphere or to a space where the pressure does not exceed atmospheric pressure, for example, by that outlet becoming blocked.
- There is communication and cooperation with enforcing authorities where necessary.
- Effective monitoring and auditing of pressure system safety arrangements is promoted.
- Staff and others who are required to work with pressure systems are provided with suitable information, instruction, training and supervision.

4.2 Line Managers, Supervisors, Technical Managers and Principal Investigators

Line Managers, Supervisors, Technical Managers and Principal Investigators are responsible for ensuring that:

- The design and installation of pressure systems is carried out by a competent person.
- Pressure systems that they are responsible for are identified and that their use is risk assessed.
- The pressure systems they are responsible for have been notified to the insurance team following the [Insurance Engineering Inspection Process](#).
- Safe systems for operation have been put in place and communicated to those who need to be aware, including details of safe operating limits.
- Ongoing maintenance and inspection are undertaken by a competent person.
- A written scheme of examination is drawn up by a competent person and that the pressure systems they are responsible for are formally examined in line with this.
- Sufficient information, drawings, design data, previous examination reports, operating history and maintenance records are provided to the competent person to enable the production and review of the written scheme of examination.
- Staff, students and others under their control are provided with instruction and training to ensure they work with pressure systems safely.

- Pressure systems under their control are not brought into service until the required written scheme of examination is in place and any examinations that are required before first use have been carried out.
- They coordinate preparation for statutory examinations, including isolation, depressurisation, cleaning, access arrangements and removal of lagging or protective devices where necessary.
- Defects identified in examination reports are rectified within the timescales specified by the competent person undertaking the examination.
- Examination reports, written schemes of examination and other supporting records, such as those referring to defects, faults, and imminent dangers are acted upon immediately, and records retained with the system's logbook.
- They investigate operational issues with the systems they oversee, employing a competent person to address any issues found.
- Any accidents, incidents or near misses involving the pressure systems they are responsible for are reported on the University's incident reporting system, and that those under their control do the same.
- Any corrective actions and repairs that are required are completed within required timescales.
- Local records relating to maintenance, examination, and operation are maintained.
- Modifications, repairs and changes to the pressure systems they oversee are carried out by competent individuals; and the written scheme of examination, safe operating limits, risk assessment and operating procedures are reviewed following this.
- Emergency procedures are in place, including those to address occasions where an immediate risk is presented by a pressure system; and these are understood and followed.

4.3 Staff, Students, Contractors, Third Parties and Visitors

Staff, students, contractors, third parties and visitors are responsible for:

- Complying with all safety arrangements and procedures in place to protect them from the risks arising from pressure systems.
- Cooperating with and following safety instructions, information and training from their Line Manager, Supervisor, Technical Manager, Principal Investigator or other safety personnel.
- Only operating pressure systems when authorised and trained to do so.
- Not interfering with protective devices, safety systems and markings.
- Ensuring vents and outlets required to remain open are not obstructed.
- Immediately reporting defects, leaks, damage, unsafe conditions and/or abnormal operating conditions to their Line Manager, Supervisor, Technical Manager, Principal Investigator or other safety personnel, and on the University's incident reporting system.
- Reporting any other issues with the pressure systems they are using, their safety devices or other associated equipment through their local reporting or escalation channels.
- Following emergency procedures in the event of faults or incidents.
- Cooperating with inspections, examinations, and maintenance activities.

4.4 Competent Person

For the purposes of the PSSR, a Competent Person is an individual or organisation possessing the appropriate knowledge, experience, practical and technical expertise to undertake the functions required by the Regulations. This role is normally fulfilled through the University's appointed insurance engineering inspection provider or another suitably competent independent specialist.

The Competent Person is responsible for:

- Determining whether a pressure system requires a WSE.
- Drawing up, certifying or reviewing WSEs in accordance with the requirements of the PSSR.
- Specifying which parts of the pressure system must be examined, the nature of the examination, any preparatory work required, and the frequency of examination.
- Carrying out examinations, or supervising examinations, in accordance with the WSE.
- Assessing whether a pressure system can continue to operate safely based on the findings of examinations.
- Identifying defects, deterioration or conditions that may affect the safe operation of the pressure system.
- Reporting defects and recommendations arising from examinations to the relevant responsible manager.
- Immediately notifying the Pressure System User and relevant enforcing authority where a defect presents an imminent risk of serious personal injury, as required by the PSSR.
- Recommending whether examination intervals, examination methods or the WSE should be amended.
- Providing examination reports that comply with the requirements of the PSSR and clearly identify any repairs, modifications, restrictions on operation or further actions required.
- Advising on the suitability of repairs, modifications or changes that may affect the integrity of the pressure system where requested.
- Maintaining appropriate professional independence and objectivity when undertaking examinations and making recommendations regarding the condition of pressure systems.

4.5 Health, Safety and Wellbeing Team

The Health, Safety and Wellbeing (HSW) Team is responsible for providing competent advice, guidance and assurance to support compliance with the PSSR and this SCoP.

The HSW Team, with support from local safety personnel, will:

- Develop, maintain and periodically review this SCoP and associated guidance.
- Provide advice and guidance to Faculties, Divisions, Managers, Technical Services staff, Principal Investigators and other duty holders on the application of the PSSR and the management of pressure systems.
- Support Faculties and Divisions in identifying legal requirements relating to pressure systems and associated activities.

- Promote awareness of pressure system hazards and control measures across the University.
- Provide advice on risk assessment, safe systems of work and emergency arrangements relating to pressure systems.
- Liaise with the University's insurance provider, engineering inspectors and other competent specialists where required.
- Monitor compliance with this SCoP through audits, inspections, reviews and other assurance activities.
- Review incident reports involving pressure systems to identify trends, lessons learned and opportunities for improvement.
- Advise on the investigation of significant incidents, dangerous occurrences and near misses involving pressure systems.
- Support communication and coordination with enforcing authorities where appropriate.
- Maintain oversight of institutional arrangements for pressure system management and report significant compliance issues to relevant University committees and senior management.
- Promote the sharing of good practice relating to the safe management of pressure systems across the University.
- Advise on the suitability of local arrangements where pressure systems are used for novel, complex or high-risk teaching, research or operational activities.

5. Requirements

5.1 Risk Assessments & Approvals

Faculties and Divisions must ensure that hazards arising from the use, maintenance, examination, repair, modification and decommissioning of pressure systems are considered within suitable and sufficient risk assessments covering the relevant work, research, teaching or operational activities.

Risk assessments must identify the hazards associated with the pressure system, evaluate the risks arising from its use, and specify appropriate control measures to eliminate or reduce those risks so far as is reasonably practicable.

The following controls are fundamental requirements for pressure system safety and must be implemented where applicable, regardless of the findings of the activity-specific risk assessment:

- Safe design, construction and installation
- Identification of safe operating limits
- Suitable operating procedures
- Planned maintenance and inspection
- Provision of a WSE (where required)
- Statutory examination by a Competent Person at the required intervals
- Appropriate information, instruction, training and supervision
- Suitable emergency arrangements

Risk assessments must be reviewed at appropriate intervals and whenever there is a reason to suspect they are no longer valid, including following:

- Significant modification of the pressure system
- Changes to operating procedures or use
- Relocation of equipment
- Introduction of new substances or processes
- Following an incident, near miss or defect
- Changes to relevant legislation or University requirements

The risk assessments must be approved by the person responsible for the activity or area the activity is to take place in. The risk assessment must also be signed by those involved in the activity to ensure that they have read, understood and agree to follow the arrangements that have been put in place.

Before any pressure system is operated, Faculties and Divisions must notify the Insurance Team by following the [Insurance Engineering Inspection Process](#). This is a vital part of risk management to keep pressure systems in full working order, so that they are safe to use and to allow critical work, research and education to continue without hinderance. Faculties and Divisions must follow the process so that their pressure systems are logged on an asset list, enabling the University's insurer to inspect the systems, devise a written scheme of examination, and carry out subsequent inspections by a competent engineer so that safety concerns or areas of non-compliance can be highlighted and addressed.

Statutory examinations carried out under the Insurance Engineering Inspection Process do not replace the need for routine maintenance, inspection, servicing, testing, operator checks or local monitoring. Faculties and Divisions must ensure that suitable maintenance and inspection arrangements are implemented in accordance with manufacturers' instructions, risk assessments and statutory requirements.

5.2 Physical Controls

There are a number of physical controls that must be implemented to ensure the safety of those operating pressure systems and others. The physical controls required will depend on the type, size and use of the pressure system.

5.2.1 Facilities and Containment/Isolation

Guards and Barriers

Where appropriate, pressure systems must be protected through the use of guards, enclosures, screens or barriers to prevent exposure to hazards arising from the release of pressure, ejection of parts, flying debris, hot surfaces or moving components.

Access to pressure systems must be restricted to authorised persons where there is a foreseeable risk to others.

Pressure systems must also be protected from external influences that could compromise their integrity, including:

- Vehicle impact
- Corrosive environments

- Mechanical damage
- Excessive vibration
- Adverse weather conditions
- External loading or structural interference

Foundations and Supports

To protect the system's integrity in operation, Faculties and Divisions must site their systems in suitable locations where there are good foundations and structural supports where required, and where thermal expansion and contraction, vibration, dynamic loading, settlement, and pipework stresses are accounted for.

Access and Examination Features

Faculties and Divisions must make sure that access hatches and other means of accessing the pressure system for maintenance and examination purposes are part of the design, in order to avoid creating additional hazards. These may include such things as manholes, handholds, access openings and inspection panels.

5.2.2 Equipment & Mechanical/Engineering Safeguards

Pressure Relief Devices and Other Protective Devices

Pressure systems must be fitted with suitable protective devices where there is a risk of exceeding safe operating limits.

Protective devices may include:

- Safety valves
- Pressure relief valves (PRVs)
- Bursting discs
- Pressure switches
- High-pressure cut-outs
- Protective control systems

Protective devices must:

- Be appropriate for the system and operating conditions
- Be correctly sized and rated
- Be maintained in effective working order
- Discharge safely without creating additional hazards

Discharges from pressure relief devices must be routed, where necessary, to a safe location to prevent injury to persons and damage to property.

Interlocks and Door Safety Devices

For some pressure equipment and systems, where the vessel requires frequent access such as an autoclave, the access point must have a system that prevents access whilst it is under pressure. For example, where the system or vessel doesn't allow pressurisation until the door is secured; once secured the door remaining so until the pressure has vented; and systems that restrain the door during the initial opening after the pressure has vented.

Pressure systems must also be fitted with other protective devices which warn of system failure, allowing for early intervention. These may include things such as safety valves, protective control systems, measuring and monitoring equipment and safety instrumentation.

Isolation Devices

Pressure systems must be provided with suitable means of isolation to allow maintenance, inspection, repair and emergency intervention to be undertaken safely.

Where appropriate, isolation arrangements may include:

- Manual isolation valves
- Lockable isolation valves
- Double block and bleed arrangements
- Electrical isolation devices
- Lockout/tagout facilities

Isolation points must be clearly identified and readily accessible.

Moisture Drains and Filters

Where the build-up of moisture, particulates and other contaminants could affect the integrity, performance or safety of pressure systems, suitable controls must be put in place such as moisture separators, condensate drains, water traps, filters and automatic drain systems.

Pipework Integrity

Pipework, hoses, fittings and associated components must be suitable for the intended operating conditions, including pressure, temperature and the nature of the contained fluid.

Where necessary, systems must incorporate:

- Expansion joints and loops
- Flexible connections
- Mechanical protection
- Corrosion protection measures
- Adequate support and restraint systems

Materials used in pressure systems must be compatible with the fluids being contained and capable of withstanding foreseeable operating conditions throughout their service life.

5.2.3 Monitoring and Detection Systems

Pressure, Temperature and Level Instrumentation

Pressure systems must be provided with suitable instrumentation and monitoring equipment to enable operators to safely monitor operating conditions and identify deviations from safe operating limits.

Depending on the nature of the system, such equipment may include:

- Pressure gauges
- Temperature indicators
- Level indicators
- Flow indicators

- Alarms
- Automatic shutdown devices
- Electronic monitoring and control systems

Instrumentation must be:

- Appropriate for the intended application
- Clearly visible or readily accessible to operators
- Maintained in effective working order
- Calibrated where necessary to ensure accuracy

Monitoring systems should provide sufficient information to enable corrective action to be taken before unsafe conditions develop.

Leak Detection and Gas Monitoring

Where failure of a pressure system could result in the release of hazardous, flammable, toxic or asphyxiating substances, suitable detection and monitoring systems must be considered as part of the risk assessment.

Examples include:

- Fixed gas detection systems
- Oxygen depletion monitoring systems
- Refrigerant leak detection systems
- Flammable gas detectors
- Process alarms linked to automatic shutdown systems

Particular consideration must be given to laboratories using inert gases such as nitrogen, argon and helium, and to areas containing cryogenic systems, gas cylinder manifolds or refrigerated plant.

5.3 Management Controls

5.3.1 Training, Competency and Supervision

Competent Person

The University has appointed an insurance engineering inspection provider to fulfil the role of Competent Person for pressure systems included within the University's Engineering Inspection Programme.

Faculties and Divisions must follow the University's Insurance Engineering Inspection Process to ensure that pressure systems are notified. This enables the Competent Person to:

- Determine whether a WSE is required
- Prepare, certify or review WSEs where required
- Undertake statutory examinations in accordance with the WSE
- Review repairs, modifications and defects where relevant
- Advise on matters affecting the continued safe operation of pressure systems

Training and Supervision

Faculties and Divisions must ensure that personnel involved in the operation, maintenance, inspection, modification or supervision of pressure systems receive suitable information, instruction, training and supervision.

Training must be commensurate with the complexity and risks of the pressure system and must include:

- Hazards associated with the system
- Safe operating procedures
- Safe operating limits
- Inspection and pre-use checks
- Emergency arrangements
- Fault reporting procedures
- Actions to be taken in the event of abnormal operating conditions

Competence must be maintained through refresher training, supervision and periodic monitoring to ensure that procedures continue to be followed correctly.

5.3.2 Procedures and Safe Systems of Work (SSW)

Written Scheme of Examination (WSE)

Pressure systems requiring a WSE must have a current WSE prepared and certified by a Competent Person.

The WSE will specify, as appropriate, items of the system to be examined, methods of examination to be followed, frequency of examination, preparatory safety measures, and any first use examinations that may be required in some scenarios such as the absence of a UKCA conformity assessment, assembled systems, or where the adequacy of existing examination arrangements can't be demonstrated.

Pressure systems must not be operated where a required WSE is absent or where examinations required under the WSE have not been completed.

Safe Operating Limits

Faculties and Divisions must determine the safe operating limits of the pressure systems they have control of. In cases where systems are purchased whole from a manufacturer, these limits will likely be included in the system information. Where systems are built by purchasing components from multiple manufacturers, the safe operating limits will need to be established by a competent person identified by the Faculty or Division.

These limits may include:

- Maximum and minimum operating pressure
- Maximum and minimum operating temperature
- Maximum filling levels
- Flow rates
- Permitted contents
- Other operating parameters necessary for safe operation.

Once established, the safe operating limits must be recorded, communicated to those who will need to operate the pressure system, and they must be reviewed following any changes, repairs or modifications to the system, or following actions from statutory examinations.

Operating Procedures and Instructions

Documented operating procedures must be established where appropriate and must include:

- Start-up procedures
- Normal operation procedures
- Shutdown procedures
- Emergency arrangements
- Actions in the event of alarms or abnormal conditions
- Information relating to protective devices
- Isolation procedures for maintenance and repair activities

Statutory Examination

Pressure systems subject to a WSE must be examined by a Competent Person at the intervals specified within the scheme.

In doing so, Faculties and Divisions must make sure that the system/s to be examined are prepared for such work. Arrangements must also be put in place to ensure that the findings of the examination and any corresponding certificates are tracked, actioned and retained. In addition, any identified defects must be tracked and corrected, with the pressure system being taken out of use in the interim if instructed by the Competent Person.

Where a pressure system needs to be taken out of use, or the due date of its next examination passes before a new exam is carried out, the system/s must be clearly signed that they are out of use and not to be used. Faculties and Divisions must label the pressure systems under their control with the date of the next statutory examination so that operators can clearly see when the system should not be used.

Management of Change

Faculties and Divisions must ensure that repairs, modifications and alterations to pressure systems are formally assessed before implementation.

The assessment must consider:

- Original design specifications
- Safe operating limits
- Structural integrity
- Suitability of materials
- Effects on protective devices
- Need for additional safeguards
- Impact on risk assessments and operating procedures
- Continued suitability of the WSE.

Where modifications may affect the pressure system's integrity or operation, the Competent Person must be consulted to determine whether the WSE requires revision.

Decommissioning

At the end of their usable life, pressure systems must be decommissioned. Faculties and Divisions must ensure that decommissioning procedures are in place, such as depressurisation, isolation, removal/safe release of stored energy, removal of hazardous substances, and system disposal.

5.3.3 Information and Instruction

Provision of Supplier Information

Where Faculties and Divisions have purchased pressure systems or components of such systems from suppliers, they must ensure they obtain information from the supplier on the design, construction, operation, examination and maintenance of the system or parts. This must then be used to inform safe operation and continued use of such systems.

Planned Maintenance Programmes

A planned preventative maintenance and inspection programme must be put in place by Faculties and Divisions for the pressure systems they control. This is separate from statutory examination that is carried out by the University's Competent Person. The programme of maintenance must be based on instructions from the supplier of the system or system components, previous history of system maintenance, actions from examination reports, the operating conditions of the system and any safety risks that may be presented.

General Maintenance of Areas in which Pressure Systems are Located

Where general maintenance of the area in which a pressure system is located is required, such as building repairs, general cleaning of work areas and cleaning of the pressure system itself, these activities must be subject to an additional activity risk assessment, ensuring that hazards presented by the pressure system, in relation to the maintenance or cleaning activity, are assessed. Staff and others involved in maintenance and cleaning activities must be informed of the hazards and what to do in emergency situations.

Record Keeping

Faculties and Divisions must retain records relating to pressure systems under their control. Records must include, as applicable:

- Asset inventories
- Risk assessments
- Safe operating limits
- Written Schemes of Examination
- Examination reports
- Maintenance and inspections records
- Defect reports
- Repair and modification records
- Design information and drawings
- Operating instructions and manuals
- Training records
- Postponement agreements where permitted under the PSSR.

Records must be readily accessible and retained for periods specified by legislation, the Competent Person, the insurer or University requirements.

5.4 Personal Protective Equipment (PPE)

Personal Protective Equipment (PPE) must be provided and used where risks associated with pressure systems cannot be adequately controlled through engineering controls, safe systems of work or other preventative measures. The type of PPE required must be determined through risk assessment and be suitable for the hazards associated with the pressure system, the substances involved and the activities being undertaken. Typical PPE may include safety glasses, chemical splash goggles, face shields, protective clothing, gloves, safety footwear, hearing protection and, where necessary, respiratory protective equipment.

Faculties and Divisions must ensure that appropriate PPE is available, maintained and replaced when necessary, and that users receive suitable information, instruction and training in its correct use. Particular consideration must be given to laboratory pressure systems, including autoclaves, pressure reactors, Schlenk lines, gas cylinder systems and cryogenic equipment, where hazards such as flying fragments, burns, chemical exposure, cryogenic injury and pressure release may exist. PPE must also be regarded as the last line of defence and must not be relied upon as a substitute for safe design, maintenance, statutory examination, protective devices and other control measures.

6. Emergency Arrangements

6.1 Emergency Planning & Preparation

Faculties and Divisions must ensure that foreseeable emergencies relating to the failure of pressure systems under their control are planned for. Those required to work with pressure systems must be provided with clear instructions on how to respond to an emergency, such as the pressure system developing a fault or unsafe condition. Emergency procedures relevant to the safe operation and shutdown of the pressure system must be documented and shared with those who are required to operate them, for example, how to operate safety devices. Emergency plans must consider the University's wider emergency response procedure, and whether emergency scenarios require a bronze, silver or gold response.

Where the University's competent person identifies an imminent danger from the system, Faculties and Divisions must ensure they have a procedure in place to address this. The procedure must document the notification of the imminent danger, direct the system to be immediately taken out of use and signage placed on it stating this, and requiring that repairs or operational changes are made before the system is put back into use.

6.2 Emergency Response & First Aid

Faculties and Divisions must make sure that they put arrangements in place for the provision of first aid and emergency response.

The first aid requirements will depend on the nature of the pressure system and the hazards associated with its operation. Consideration must be given to foreseeable injuries and ill health effects, including:

- Burns and scalds from steam, hot water or hot surfaces
- Chemical burns and exposure to hazardous substances
- Cryogenic burns and cold-contact injuries

- Injuries arising from equipment failure or flying debris
- Asphyxiation resulting from the release of inert gases
- Injuries associated with fire or explosion

Where the University's standard first aid provision is not adequate for addressing such first aid incidents, Faculties and Divisions must carry out a first aid needs assessment to identify what additional resource they require. Faculties and Divisions must ensure that any additional resource required is funded and maintained.

6.3 Reporting Incidents & Accidents

Faculties and Divisions must ensure that any incidents, accidents and near misses in relation to the operation of pressure systems are reported on the University's incident reporting system.

Faculties and Divisions must ensure that when an incident, accident or near miss occurs, this is followed up with those concerned to make sure they are recovering and if anything can be done to prevent or reduce the likelihood of reoccurrence.

Where the Health, Safety and Wellbeing Team may need to carry out an investigation, Faculties and Divisions must support this process.

Some incidents involving pressure systems need to be reported to the Health and Safety Executive (HSE) under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR). Prompt reporting through the University's incident reporting system is therefore essential to enable the HSW Team to assess whether statutory notification is required and, where applicable, submit reports to the enforcing authority within the required timescales.

7. Transport

The transport of pressure equipment may be subject to additional legal requirements under the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (CDG). Faculties and Divisions must ensure that any movement of compressed gas cylinders, cryogenic vessels, transportable pressure receptacles or other pressure equipment is undertaken in compliance with applicable transport legislation and University procedures.

Before transporting pressure equipment, suitable arrangements must be in place to prevent damage, loss or containment or other safety risks. Equipment must be appropriately secured, protected from impact, and handled by persons who have received suitable information, instruction and training. Compliance with transport legislation does not remove the requirement to comply with the PSSR when pressure equipment is installed, operated or used on University premises.

8. Monitoring & Assurance

Faculties and Divisions must implement local arrangements to monitor compliance with this SCoP and ensure that pressure systems are managed safely. This includes verifying that risk assessments, safe systems of work, maintenance programmes, WSEs and statutory

examinations are in place and effective, and that actions arising from inspections, examinations, audits, incidents and maintenance activities are completed within agreed timescales.

The HSW Team will provide institutional oversight of pressure system safety through inspection, audit, incident review, and other assurance activities. Findings from these activities will be used to share good practice, identify areas for improvement, and monitor compliance with this SCoP and relevant legal requirements. Faculties and Divisions must cooperate with these assurance activities and implement any corrective actions identified.

9. Records & Retention Requirements

Faculties and Divisions must ensure that records relating to the safe management of pressure systems are maintained, accessible and protected from loss or damage. Records may be held electronically or in hard copy.

As a minimum, risk assessments must be retained for 5 years after being superseded. Operating procedures, inspection records, maintenance records, audit records, WSEs and examination reports must be retained for 10 years after being superseded. Records relating to the design, safe operating limits, repairs, modifications and maintenance history of a pressure system must be retained for the life of the system. Where a pressure system is decommissioned or transferred, all relevant records must be retained or transferred accordingly.

10. Further Information / Guidance

- [HSE Pressure Systems](#)
- [Safety of Pressure Systems Approved Code of Practice \(L122\)](#)
- [HSG253: The Safe Isolation of Plant and Equipment](#)
- [HSG250: Guidance on Permit-to-Work Systems](#)

11. Legislation & Standards

- [The Pressure System Safety Regulations 2000](#)
- [Provision and Use of Work Equipment Regulations 1998 \(PUWER\)](#)
- [Personal Protective Equipment at Work Regulations 1992 \(as amended\)](#)
- [Dangerous Substances and Explosive Atmospheres Regulations 2002 \(DSEAR\)](#)
- [Control of Substances Hazardous to Health Regulations 2002 \(COSHH\)](#)
- [Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 \(RIDDOR\)](#)
- [Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 \(CDG\)](#)

12. References

- [UoS Pressure Systems webpage](#)
- [Insurance Engineering Inspection Process](#)

13. Appendices

This section is not relevant to the scope of this document.

14. Document Control

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