





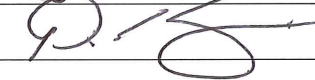
ESTATES DEPARTMENT

Safe Systems of Work
Pressure Systems Safety

Rev 2

Document History

Document Revision	Date	Description of amendments	Revision Author
1	12/07/2018	Procedure developed by Matt Cheney and issued as a departmental procedural document in replacement of the previously titled 'Permit to Work Procedure'.	MC
2	18/12/2018	Update to section 1.3 responsibilities. Update EMM/EPM to AP throughout document.	MC
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SECTION 1

Estates Pressure Systems Safety Procedure

1.1 Introduction & Scope

1.1.1 This procedure has been developed as part of a suite of SSoW processes for the Estates Department. The person with overall responsibility for controlling and updating these procedures is the Assistant Director of Estates (Maintenance & Compliance).

1.1.2 Compliance with this procedure is mandatory in order to establish safe working practices for the protection of persons under the management of Estates whose activities involve installation, setup, maintenance, modification or decommissioning of pressure systems at University of Kent campuses. The definition of a pressure system and pressure equipment are as follows;

“Pressure system” means—

- A system comprising one or more pressure vessels of rigid construction, any associated pipework and protective devices;
- The pipework with its protective devices to which a transportable pressure receptacle is, or is intended to be, connected; or
- A pipeline and its protective devices, which contains or is liable to contain a relevant fluid, but does not include a transportable pressure receptacle.

“Pressure equipment” means—

- Vessels, piping, safety accessories and pressure accessories.
- Where applicable, includes elements attached to pressurised parts such as flanges, nozzles, couplings, supports, lifting lugs etc.

“Relevant Fluid” means-

- Any fluid that would have a vapour pressure greater than 0.5 bar (7.5 psi) above atmospheric pressure when in equilibrium with its vapour at either the actual temperature of the liquid or 17.5 degrees Celsius.
- Steam at any pressure

1.1.3 The procedure governs work associated with University of Kent and applies to both employees of the University of Kent’s Estates Department and those contractors and suppliers engaged by University of Kent, directly or via third parties, to work on its sites and premises.

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- 1.1.4 All persons who are, or who may be, associated with installation, setup, maintenance, modification or decommissioning of pressure systems shall comply with the University of Kent's Pressure Systems Safety Procedure, which observe the following statutory provisions:
- Pressure Systems Safety Regulations 2000
 - Pressure Equipment Regulations 1999
 - Provision and use of work equipment regulations 1998
 - The Health and Safety at Work Act 1974 and subordinate legislation;
 - The Management of Health and Safety at Work Regulations 1999
- 1.1.5 Any work undertaken may also be governed by University of Kent policies and safety rules other than those for pressure systems, such as those applying to general Occupational Health and Safety matters and not least the requirement that work activities are subjected to risk assessment and method statement.
- 1.1.6 This procedure outlines the University of Kent's Safety rules and arrangements to achieve compliance of the Pressure Systems Regulations 2000 and to ensure employees and contractors are not exposed to unnecessary risks associated with pressure systems.
- 1.1.7 These arrangements will assist employees with assessing the risks associated with the various scenarios encountered while working on pressure systems and also outlines the duties of those persons engaging in work activities on pressure systems to enable them to work safely.
- 1.1.8 The University of Kent recognises that a number of activities will require work involving pressure systems and staff may be required to install, maintain, modify, decommission parts of these systems as part of their duties, this procedure has been developed to:
- Ensure that all pressure systems and hazards likely to be encountered are known
 - Ensure that all activities involving pressure systems are subjected to a suitable and sufficient risk assessment and that only trained staff with the correct tools and equipment undertake any work to pressure systems;
 - Set the health, safety, and principles for pressure system activities and ensure that these are communicated to staff;
 - Ensure that the University's Permit to Work system is followed when any work to pressure systems is undertaken.
 - Ensure that management and staff are fully aware of the duties under H&S law.

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1.1.9 This procedure covers all equipment and assets which are owned or used by University of Kent staff or contractors on the Estates Departments request, carry out work on or with pressure systems. Some common pressure systems include:

- Autoclaves
- Pressure gauges and indicators
- Valves
- Air Compressors
- Pipework and hoses
- Heat exchangers
- Pressure cookers
- Steam traps and filters
- Heating Calorifiers
- Boilers
- Expansion Vessels
- Vapour Compression Refrigeration
- Pressurised Bottled Gas

1.2 Application of the Estates Pressure System Safety Procedure

1.2.1 All persons who have cause in the normal course of their duties to be involved with or part of this procedure, shall be provided with a copy of this procedure by the appropriate manager.

1.2.2 Contractors or any other persons working on University property who have cause to be involved with work outlined in 1.1.4 above, will be supplied with a copy of this procedure by the appropriate manager

1.2.3 All employees and persons issued with this procedure shall sign a receipt for their copy and shall keep them in good condition and have them available for reference.

1.3 Responsibilities and Competency

Those having specific responsibilities for pressure system safety matters include the following:

Assistant Director (Maintenance & Compliance) is the Duty Holder, who is the person responsible for controlling Work activities under The Pressure Systems Safety Regulations 2000 and updating and maintaining these procedures.

Estates Maintenance Manager (EMM) - A person who fulfils the requirements of a Competent Person is over 21 years of age, who is principally of an engineering discipline or who has significant experience

and who has had adequate training to work without danger and accepts responsibility for the safety of others working under his direction.

Estates Project Manager (EPM) - A person who fulfils the requirements of a Competent Person is over 21 years of age, who is principally of an engineering discipline or who has significant experience and who has had adequate training to work without danger and accepts responsibility for the safety of others working under his direction.

The EMM/EPM shall be considered authorised persons (AP) following written authority from the duty holder.

Apart from EMM and EPM other positions may also be classified as Authorised Persons and shall receive written authority from the duty holder.

The AP will ensure compliance with the requirements of the Pressure Systems Safety Regulations 2000 and this safe working procedure by;

- Identifying pressure systems when specifying work
- Carrying out a risk assessment considering the task and the location of work.
- Agreeing a safe working procedure with those carrying out the work and issuing an appropriate permit;
- Ensuring the control measures identified in the risk assessment and Permit are communicated to those carrying out the work and that those control measures have been understood.

Authorised Persons shall hold recognised formal qualifications beyond their experience with a minimum of City & Guilds or equivalent. Where formal City & Guilds type qualifications have not been attained a recognised ONC, HNC, HND or Degree relevant to the AP activity will satisfy this requirement.

Competent Person (CP) - A person who is essentially of an engineering discipline and has adequate technical knowledge and experience of the system or equipment to be worked on to avoid danger to himself or others for whom he may be responsible. See also section 1.10

Competent Person(s) shall comply with this procedure by;

- Carrying out their roles safely in line with their training
- Complying with all requirements set out in the risk assessment and the relevant permit.
- Ensuring that any stored energy is released from the system and valves are safely isolated.

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- In the event of an emergency or suspected emergency initiate the agreed actions identified in the safe working procedure with the Estates manager.

The APs, and the maintenance trades staff at the University of Kent are deemed Competent Persons by reason of training and experience. See also Section 1.10.

Competent Person (Pressure systems) (CPPS) - A competent individual person (other than an employee), or a competent body of persons corporate or incorporate. More commonly indicated as:

A Suitably qualified engineer surveyor, normally of an Insurance Company, employed by the external Company on behalf of University of Kent for the purposes of carrying out examinations on pressure systems.

Note: CPPS should not be confused with reference to competent persons in section 1.3

1.4 Standard Operating Procedures

Some activities or equipment may have standard operating procedures or similar documentation in place, developed by the Estates Department, to ensure safe working practices and methods are adopted. The introduction of standard operating procedures can play a positive role in risk reduction and may alleviate the requirement of a Pressure Systems Permit. Where it is identified that a Standard Operating Procedure is required it will be the responsibility of the Authorised person (AP) to ensure this is in place.

1.5 Dangerous Occurrences or Accidents

All Dangerous Occurrences and Accidents shall be immediately reported to line management, to the Health and Safety Advisor and to the AP.

1.6 Operational Restrictions

Operational restrictions identified from any source are to be registered with the AP. They may include, but may not be limited to:

- Health and Safety Executive (HSE) safety alerts
- Manufacturer's product safety alerts
- Failures of monitoring equipment during operation
- Third party reports and other safety alerts.

1.7 Objection to Instructions

If a person has an objection on safety grounds to instructions received for work on pressure systems, or the operation of any high pressure equipment, he/she shall make their objection known to their line manager. The manager shall consider the matter immediately, referring to the AP if the matter cannot otherwise be resolved.

1.8 Signs and Barriers

Responsibility for placing in position or moving any signs or barriers required in connection with the issuing of written work authorisation documents rests with the AP/Competent Person (CP).

1.9 Review of Estates Department Pressure Systems Procedure

Due to the nature of any work undertaken on pressure systems this procedure will be under constant review, updated and amended accordingly.

1.10 Information, Instruction & Training

Arrangements shall be made by the University to ensure:

- That all employees concerned are adequately trained, informed and instructed as to the property, equipment and activities which are affected by particular aspects of work and which legal requirements, safety procedures and related documents still apply.
- That other persons that are not employees but who may be affected by the operations or work also received adequate information, instruction and training where appropriate.

Never work on any pressure system or attempt to operate any pressure equipment unless you have received the necessary training, have appropriate experience and have been authorised to undertake the work.

SECTION 2

Safe Use and Maintenance of Pressure Systems

2.1 Procedure

The aim of this procedure is to prevent serious injury from the hazard of stored energy as a result of failure of a pressure system or one of its component parts and to ensure any requirements are met under the Pressure Systems Safety Regulations.

Before using any qualifying pressure equipment (new or otherwise), a written scheme of examination (WSE) must be in place, and an examination undertaken.

2.2 Design & Installations

All pressure systems shall be designed, manufactured and installed to be safe and without risks to health when used at work. Adequate documentation shall be provided to the user to ensure that the system can be maintained and operated safely and without risk to health.

When planning the installation, the AP should ensure that all of the following items are actioned where relevant. Please note that this list is not exhaustive. Additional actions may be needed depending on the type of system, its location, and planned operating conditions. The AP should:

- Ensure that those undertaking the installation have the required training, skills and experience;
- Provide adequate supervision, taking into account the complexity of the system being installed;
- Decide on the most suitable method of lifting and handling the vessel(s), protective devices and pipework, so as to avoid accidental damage;
- Check for signs of damage in transit;
- Protect the system from adverse weather conditions before and during installation;
- Remove any protective packaging carefully before commissioning;
- Ensure that any hot work, such as welding or cutting, will not affect the integrity of the system;
- Ensure that protective devices are clear of obstruction, operate correctly without hindrance or blockage and that the discharge is routed to a safe place;

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- Ensure that any access doors/hatches are clear of obstruction and operate correctly;
- Ensure that any labels or markings attached to the system are clearly visible;
- Provide adequate access for maintenance and examination purposes;
- Provide suitable physical protection against mechanical damage, eg accidental impact by vehicles;
- Allow sufficient space for access around and beneath valves, in particular drain valves;
- Clear away any debris such as metal shavings or dust arising from the installation process; and
- Have the installation work checked and approved on completion by a suitably qualified person.

2.2.1 Compressed Air Systems

- Additional points which should be noted for compressed air systems are:
- The installation site should provide a well-ventilated, cool and clean air environment;
- Intercoolers and aftercoolers should, where they are cooled by air, be located so that the air flow over their surfaces is not obstructed;
- Inlet air should be drawn from an area which is free from potentially flammable or corrosive concentrations of fumes or vapours; and
- The inlet air should not be excessively laden with moisture or dust.

Modifications or changes to existing installations should always be carried out in line with a suitable and sufficient risk assessment, manufacturer's recommendations and any specific control measures or work methods.

All associated drawings, risk assessments and testing schedules are updated by the designer before the system handover. The AP must ensure that all new systems have completed drawings, risk assessments and test schedules and a written scheme of examination is in place.

2.3 Safe Operating Limits

Where a standard system is installed then the designer/manufacture should have assessed the safe operating limits of the system/part and pass the information to the Estates Department (AP). In cases where the University of Kent has specified the design then responsibility for establishing the safe operating limits is adopted. The University of Kent employs a CPPS who will determine the safe operating limits of the system and will also certify it as safe after any new installation, modification etc.

These operating limits incorporate a suitable margin of safety, beyond which failure is liable to occur. The Safe Working Pressure will be specified on the certificate of test or in the most recent report of an examination.

The exact nature and type of safe operating limits which need to be specified will depend on the complexity and operating conditions of the particular system. Small, simple systems may need little more than the establishment of the maximum pressure for safe operation. Complex, larger systems are likely to need a wide range of conditions specified, e.g. maximum and minimum temperatures and pressures, nature, volumes and flow rates of contents, operating times, heat input or coolant flow. In all cases the safe operating limits should incorporate a suitable margin of safety.

2.4 Examination, Testing and Reporting

The Estates Mechanical Maintenance Manager must maintain a Plant Record Folder, to be known as the Written Scheme of Examination for each pressure system. This must contain every item of plant subject to examination, testing and reporting. These files are to be held within the Estates Maintenance Centre with scanned pdf files or equivalent saved on the shared drive (SharePoint).

Where the AP is accepting a building or any part thereof which incorporates a pressure system or which is served from an existing pressure system they must accept the system on behalf of the University of Kent and ensure that all associated pressure systems certification is handed to the Estates Mechanical Maintenance Manager. It will also be the responsibility of the AP to ensure that a suitable Written Scheme of Examination is made available on completion of the works, prior to any pressure system being brought to use. Each folder should contain copies of the following documents:

- A brief description of the system;
- A Certificate of test, together with any documents arising from examination(s) made during the construction of the plant;
- A detail sheet containing the relevant information on the particular item of plant, including a list of incorporated plant, safety valves, pressure gauges, thermometers, high and low pressure safety devices, bursting discs and other safety controls;
- Every current Report of Examination together with a record of action taken to comply with any recommendations made. (Such reports may not exist on installations less than one year old, but may be relevant where projects extend beyond and plant has been in operation for 12months or more).

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- A record of any examination, test or modification carried out on any part of the plant.
- Particulars of any defects which affects the safe working of the plant, and a record of the steps taken to report and remedy the defect.
- A schematic diagram or drawing specific to the relevant pressure system.

The AP shall be responsible for ensuring that pressure systems are adequately prepared in readiness for a thorough inspection.

Assistance must always be provided to operate systems to the requirements of a CPPS to allow a thorough inspection to be completed.

2.5 Schedule for Works / Planned Preventative Maintenance (PPM)

All pressure equipment and systems should be properly maintained. There should be a maintenance programme for the system as a whole. It should take into account the system and equipment age, its uses and the environment.

The AP will ensure, with the cooperation of staff a schedule of works to be carried out. Preventative maintenance will be agreed and carried out by either the University or an approved contractor.

The scope of this work will depend upon the specific nature of the work and will be agreed by the Duty holder or his nominee.

The Duty holder will ensure that a suitable budget is set aside for any planned works to be carried out. There will be provision within this budget for any remedial works required to be carried out.

Look for tell-tale signs of problems with the system, e.g. if a safety valve repeatedly discharges this could be an indication that either the system is over-pressurising or the safety valve is not working correctly.

Look for signs of wear and corrosion.

Systems should be depressurised before maintenance work is carried out. Ensure there is a safe system of work, so that maintenance work is carried out properly and under suitable supervision and permit.

Appendix 1: Permit to Work

Permit to Work – Pressure Systems Estates SSoW: Pressure Systems Safety Procedure	
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Permit to Work – Pressure Systems			
Date	<input style="width: 90%;" type="text"/>	Time	<input style="width: 90%;" type="text"/>
	Permit Number	<input style="width: 90%;" type="text"/>	
Description of Work	<input style="width: 95%; height: 30px;" type="text"/>		
Exact Location of Proposed Work	<input style="width: 95%; height: 30px;" type="text"/>		
Checklist	YES	NO	N/A
Is the Plant Record Folder (WSE) available for the Pressure System?	<input type="checkbox"/>	<input type="checkbox"/>	
Is there a Risk Assessment / Method statement for the work?	<input type="checkbox"/>	<input type="checkbox"/>	
Persons working on the system are appropriately trained to perform the task?	<input type="checkbox"/>	<input type="checkbox"/>	
Type of pressure system to be worked on:			
Hydraulic	<input type="checkbox"/>	Pneumatic	<input type="checkbox"/>
Compressed Air	<input type="checkbox"/>	Gas	<input type="checkbox"/>
Steam	<input type="checkbox"/>	HPHW	<input type="checkbox"/>
Has the system pump been turned off?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Isolation valves have been shut off?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All stored energy in the pressure system has been released	<input type="checkbox"/>	<input type="checkbox"/>	
Safety locks have been applied?	<input type="checkbox"/>	<input type="checkbox"/>	
Have caution / danger notices been fitted?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Procedures inc. emergency arrangements have been communicated to all personnel?	<input type="checkbox"/>	<input type="checkbox"/>	
Are all personnel aware of the steps to take if asbestos materials are uncovered?	<input type="checkbox"/>	<input type="checkbox"/>	
Building occupants have been notified?	<input type="checkbox"/>	<input type="checkbox"/>	
Are there any other safety measures or special instructions?	<input type="checkbox"/>	<input type="checkbox"/>	
If yes, please provide details below.			
<input style="width: 95%; height: 20px;" type="text"/>			
I am satisfied that the conditions for this Permit to Work have been met and the work specified in this Permit to Work can proceed.			
UoK Permit Authority	<input style="width: 90%;" type="text"/>	Contact No	<input style="width: 90%;" type="text"/>
Signature	<input style="width: 90%;" type="text"/>	Date	<input style="width: 90%;" type="text"/>
I confirm that all controls as above are in place and I have understood the requirements of this permit.			
Competent Person	<input style="width: 90%;" type="text"/>	Contact No	<input style="width: 90%;" type="text"/>
Signature	<input style="width: 90%;" type="text"/>	Date	<input style="width: 90%;" type="text"/>
Work Completion			
I have inspected the worksite. I am satisfied that the work is complete, all equipment returned and the site safe.			
Uok Permit Authority	<input style="width: 95%;" type="text"/>		
Signature	<input style="width: 90%;" type="text"/>	Date	<input style="width: 90%;" type="text"/>