



Health and Safety

Pressure Systems

Minimum Standard

Version	V1.0
Author/s	Lee McGurty
Approver	ELT Operating Committee
Effective Date	28/11/2022
Review Date	28/11/2025

1 Aims and Principles

The aim of this Government of Jersey (GoJ) Minimum Standard is to provide guidance on the steps which should be taken to ensure that the risks posed by pressure systems are adequately controlled to prevent harm.

Departments responsible for managing these risks must develop their own procedures which detail the specific arrangements to be implemented. The procedures must include the standards set out in this document or be of an equivalent or higher standard.

2 Legislation and Guidance

a) Applicable Legislation and Approved Code of Practice

Health and Safety at Work (Jersey) Law, 1989

Safety of Pressure Systems and Transportable Gas Containers – Approved Code of Practice (ACoP 3)

b) Guidance

Pressure Systems: A brief guide to safety (UK HSE)

Pressure Systems: Guidance on safe pressure systems

Pressure systems: Guidance on written schemes of examination for safety of pressure systems

3 Definitions

Pressure System

Either of the following which contains or is liable to contain a relevant fluid, but does not include a transportable gas container.

- 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 gas container is, or is intended to be, connected;

Mobile Pressure System

A pressure system which can be readily moved between and used in different locations e.g. mobile air compressor sets

User

The department which has control of the operation of the pressure system

Competent person

A competent individual person (other than an employee) or a competent body of persons with responsibility for:

- Advising the users of pressure systems on the scope of the written scheme of examination
- Drawing up and certifying schemes of examination
- Carrying out examinations under the scheme

Written Scheme of Examination

A written scheme of examination is a document containing information about selected items of plant or equipment which form a pressure system, operate under pressure and contain a 'relevant fluid'.

Relevant Fluid

Compressed or liquefied gas including air above 0.5 bar pressure (7.25 psi), pressurised hot water above 100°C and steam at any pressure.

Protective Device

Any device, including bursting discs, which are designed to protect the pressure system against system failure and includes devices designed to give warning that system failure might occur

Safe Operating Limits

The operating limits, incorporating a suitable margin for safety, beyond which system failure is likely to occur.

Further definitions are available in the Jersey [Pressure Systems ACoP](#).

4 Who this Minimum Standard Applies to

- All Government of Jersey (GoJ) and States' employees
- Voluntary staff or those on honorary contracts where there is no implied contract of employment

5 Links to other GoJ Policies, Minimum Standards and Guidance

a) Policies

Government of Jersey - Health and Safety Policy

b) GoJ Minimum Standards

Risk Assessment
Permit to Work
Control of Contractors

6 Roles and Responsibilities

The department's arrangements must clearly set out the roles and responsibilities of those required to manage the risks to employees and others from pressure systems.

Reference should be made to the Government of Jersey Health and Safety Policy for general responsibilities.

7 Overview

Pressure systems in the workplace are covered by the Jersey [Approved Code of Practice \(ACoP 3\) - Safety of Pressure Systems and Transportable Gas Containers](#) (Pressure Systems ACoP)

This Minimum Standard provides a summary of the requirements of the Pressure Systems ACoP and the measures which should be taken to ensure the safe operation of such systems.

The Pressure Systems ACoP contains further details of the expected standards and must be consulted in conjunction with this Minimum Standard.

Following the standards set out in the ACoP will help to ensure compliance with the Health and Safety at Work (Jersey) Law, 1989.

8 General

Pressure systems pose significant risks to persons and suitable arrangements must be in place to ensure that these risks are adequately controlled.

Typical causes of incidents involving pressure systems and transportable gas containers include:

- Poor equipment and/or system design
- Poor maintenance of equipment
- An unsafe system of work
- Operator error, poor training/supervision
- Poor installation
- Inadequate repairs or modifications

The main hazards which can arise are:

- Impact from the blast of an explosion or release of compressed liquid or gas
- Impact from parts of equipment that fail or any flying debris
- Contact with released liquid or gas, such as steam
- Fire resulting from the escape of flammable liquids or gases

9 Responsibilities

Departments responsible for pressure systems are required to:

- Provide safe and suitable equipment by ensuring that the equipment is suitable for its intended purpose and installed correctly that any modifications/repairs carried out properly
- Define and document the types of materials and components used. This information should be provided by the manufacturer of the pressure system
- Establish the safe operating limits of the plant
- Fit suitable protective devices and ensure they function properly e.g. devices such as safety valves, bursting discs and electronic appliances, and ensure they are adjusted to their correct settings and in good working order at all times
- Provide adequate operating instructions to ensure the plant is operated within its safe operating limits, and emergency instructions
- Ensure that the plant is properly maintained
- Appoint a competent person(s) as required
- Have a suitable written scheme drawn up or certified by a competent person for the examination at appropriate intervals of most pressure vessels and all safety devices, and any pipework which is potentially dangerous. The user may seek the advice of any competent person when deciding what vessels and parts of the pipework need to be included in the

scheme

- Arrange to have examinations carried out by a competent person at the intervals set down in the scheme
- Keep adequate records of the most recent examination and any manufacturer's records supplied with new plant
- Ensure a robust system for document control is in place to reduce the risk of outdated information being used
- Make provision for appropriate training to ensure that anybody who operates, installs, maintains, repairs, inspects or tests pressure equipment has the necessary skills and knowledge to carry out their job safely. Refresher training should be included (Ref: Section 14).

10 Types of Pressure Systems

Pressure systems can be divided into three categories:

Minor systems

These include those systems containing steam, pressurised hot water, compressed air, inert gases or fluorocarbon refrigerants which are small and present few engineering problems.

The pressure should be less than 20 bar (290 psi) above atmospheric pressure (except for systems with a direct-fired heat source when it should be less than 2 bar (29 psi)).

The pressure-volume product for the largest vessel should be less than 2×10^5 bar litres.

The temperatures in the system should be between -20°C and 250°C except in the case of smaller refrigeration systems operating at lower temperatures which will also fall into this category

Intermediate systems

These include the majority of storage systems and process systems which do not fall into either of the other two categories

Major systems

Due to their size, complexity or hazardous contents, these systems require the highest level of expertise in determining their condition.

They include:

- Steam generating systems where the individual capacities of the steam generators are more than 10 MW
- Any pressure storage system where the pressure-volume product for the largest pressure vessel is more than 10^6 bar litres
- Any manufacturing or chemical reaction system where the pressure-volume product for the largest pressure vessel is more than 10^5 bar litres

11 Identifying Pressure Systems

The first step in ensuring the safe management of pressure systems is to identify any plant or equipment in the workplace which operates under pressure.

Examples of pressure systems include:

- Boilers and steam heating systems
- Pressurised process plant and piping
- Compressed air systems (fixed and portable)
- Pressure cookers, autoclaves and retorts
- Heat exchangers and refrigeration plant
- Valves, steam traps and filters
- Pipework and hoses
- Pressure gauges and level indicators

Examples of pressure systems which are likely to be excluded from the requirements of the Pressure Systems ACoP are:

- An office hot water urn (for making tea);
- A machine tool hydraulic system
- A pneumatic cylinder in a compressed air system
- A hand-held tool
- A combustion engine cooling system
- A portable fire extinguisher with a working pressure below 25 bar (362.5 psi) at 60°C and having a total mass not exceeding 23 kilograms
- A portable LPG cylinder
- A tyre used on a vehicle

Appendix A contains a flow chart to assist with the identification of pressure systems and further guidance is also available in the leaflet, [Pressure Systems: Guidance on safe pressure systems](#).

12 Installation of Pressure Systems

Any department responsible for engaging an installer of pressure systems should ensure that the following items are considered and addressed by the installer. This list is not exhaustive and additional actions may be required depending on the type of system, its location and the planned operating conditions.

The installer should ensure that:

- Those doing the installation have the required training, skills and experience
- Adequate supervision is provided, taking into account the complexity of the system being installed
- Suitable foundations have been provided to support the system, taking into account the nature of the ground and design loads such as the weight of the system and any likely external forces
- The most suitable methods of lifting and handling the vessel(s), protective devices and pipework are used, so as to avoid accidental damage
- The plant is checked for signs of damage in transit prior to installation
- Measures are in place to protect the system from adverse weather conditions before and during installation
- Any protective packaging is removed carefully before commissioning
- Any hot work, such as welding or cutting, will not affect the integrity of the system
- Protective devices are clear of obstruction, operate correctly without hindrance or blockage and that the discharge is routed to a safe place
- Any access doors/hatches are clear of obstruction and operate correctly
- Any labels or markings attached to the system are clearly visible
- Adequate access for maintenance and examination purposes is provided
- Suitable physical protection against mechanical damage e.g. accidental impact by vehicles, is provided
- Sufficient space for access around and beneath valves, in particular drain valves is provided
- Any debris, such as metal shavings or dust arising from the installation process will be cleared away
- The installation work will be checked and approved on completion by a suitably qualified person.

Where a compressed air system is being installed, additional points which should be considered by the installer are that:

- 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
- The inlet air should not be excessively laden with moisture or dust.

13 Provision of Information to Users and Marking of Pressure Systems

The designer, manufacturer, supplier or person who modifies or repairs a pressure system must provide the department responsible for that system, whether fixed or mobile, with adequate information on the operation, maintenance and examination required to ensure its safety.

The designer and manufacturer will have specified the design parameters and will be best placed to determine the proper conditions of use, including the safe operating limits for the system or parts they are responsible. They may also set out an adequate scheme of examination to assist users who may have little expertise themselves.

The following basic information should, where practicable, be permanently marked on the pressure vessel.

- The manufacturer's name.
- A serial number to identify the vessel.
- The date of manufacture of the vessel.
- The standard to which the vessel was built.
- The maximum design pressure of the vessel.
- The minimum design pressure of the vessel where it is other than atmospheric.
- The design temperature.

Additional information about pressure vessels and information relevant to the whole system should be provided to the user in writing and may include:

- Design standards used and evidence of compliance with national/ European/international standards or certificates of conformity (both those issued by manufacturers and by inspection bodies)
- Design pressures (maximum and minimum)
- Fatigue life
- Design temperatures (maximum and minimum)
- Creep life
- Intended contents especially where the design has been carried out for a specific process
- Flow rates and discharge capacities
- Corrosion allowances
- Wall thickness
- Capacities, especially for storage vessels. This may be expressed, depending on the intended contents, as maximum volume, pressure or filling ratio
- Materials of construction.

14 Provision of Training to Users of Pressure Systems

Departments should ensure that any employees working with pressure systems have the necessary skills and knowledge to enable them to carry out their tasks, such as operation and maintenance.

Training should be relevant to the type of pressure system and should be proportionate to the risks involved.

Suitable training, containing the following, should be provided:

- The risks associated with the pressure system type
- The safety features of the pressure system
- The safe operating procedures (Ref: Section 13)
- The safe operating limits
- Isolation procedures for maintenance
- Any Permits to Work required
- Any special procedures to be followed in the event of an emergency.

Additional training or retraining may be required if:

- The job changes
- The equipment or operation changes
- Skills have not been used for a while.

15 Appointing a Competent Person

It is the responsibility of the relevant department to select a competent person who is capable of carrying out the duties specified in the Pressure Systems ACoP. The person/organisation should be on the GoJ Approved Contractors List.

These duties are:

- Advising the user of the system on the scope of the written scheme
- Drawing up or certifying schemes of examination
- Carrying out examinations under the scheme

Where the expertise needed is not available within the department, a properly qualified and experienced independent inspection body will need to be appointed.

Pressure systems vary greatly in both complexity and sophistication and it is critical that the competent person has sufficient expertise in the particular type of system. For example, a competent person who is suitable for drawing up or certifying schemes of examinations or examining a simple system may not have the expertise to function adequately as a competent person for complex systems.

For the competent person to be able to draw up, or certify as suitable, schemes of examination, they must have:

- Practical and theoretical knowledge
- Actual experience of relevant systems
- Access to specialist services
- Effective organization
- A proper degree of independence from those responsible for the operating function
- Proper standards of professional probity
- Sufficient understanding of such systems,

The attributes needed for competent persons who draw up or certify schemes of examination relating to minor, intermediate and major systems are shown in Appendix B.

Depending on the requirements of the department, it may be necessary to appoint more than one competent person to provide the necessary services.

16 Written Schemes of Examination

Any department which uses an installed system or is the owner of a mobile pressure system must ensure that a scheme is in place for future examinations of relevant parts of the pressure system at appropriate intervals.

The system must not be permitted to be operated unless a scheme of examination is in place which has been certified by a competent person (Ref Section 14). If appropriate technical expertise exists in-house, the scheme of examination can be drawn up and certified by a competent individual within the department.

The written scheme of examination may be kept in hard copy form, stored electronically or on a storage device. If a computer system is used, it should be able to reproduce the scheme readily as a written copy, be authenticated by the competent person and be protected from unauthorised alteration.

The written scheme should be reviewed periodically by the competent person.

The scheme must be reviewed at appropriate intervals by the appointed competent person to determine whether it is suitable in current conditions of use of the system. The department responsible for the system must ensure that content of the scheme is modified in accordance with any recommendations made by the competent person arising out of that review.

The typical contents of a written scheme of examinations are:

- Identification number of the item of plant or equipment
- Those parts of the item which are to be examined
- Any examinations required before being taken into use for the first time
- The nature of the examination required, including the inspection and testing to be carried out on any protective devices
- Details of any repairs or modifications which will require examination by a competent person before being taken back into use
- The preparatory work necessary to enable the item to be examined
- The date by which the initial examination is to be completed (for newly installed systems);
- The maximum interval between one examination and the next (Ref: Section 17)
- The critical parts of the system which if modified or repaired should be examined by a competent person before the system
- the name of the competent person certifying the written scheme of examination;
- The date of certification

Further information on the contents of a written scheme is available in the guidance leaflet [Pressure systems: Guidance on written schemes of examination for safety of pressure systems](#)

17 Examination Intervals

The competent person will determine the maximum interval between examinations based on the type of plant, its safety record, its current condition and an evaluation of the expected conditions of its operation.

The Pressure Systems ACoP details the examination intervals for certain types of pressure systems, as shown below, which should be referred to by the competent person when determining suitable examination intervals.

Steam and pressurised hot water plant

The period between examinations for boilers should generally not exceed 14 months.

A shorter period will be necessary for boilers operating under arduous conditions or when the condition of the boiler has deteriorated.

Longer periods should only be set for boilers where experience of the type of boiler shows that it is reasonable to do so and the arrangements for maintaining the safety of the system are to a high standard. In particular it will be necessary to consider water treatment arrangements.

More flexibility can be allowed for the period between examinations of boiler receivers. This should generally be in the range of 26 to 38 months but it may be convenient to examine them at the same time as the boilers to which they are connected.

The first examination of a boiler should take place before it is taken into use for the first time.

Superheaters and similar plant items

These should be examined at the same intervals as boilers of similar size and complexity.

Compressed air systems

It is not normally necessary to include air compressors in the scheme of examination.

Air receivers should be examined at intervals between 24 to 48 months. However, a period of 72 months may be appropriate where there is not liable to be significant corrosion, and the arrangements for maintaining the safety of the system are to a high standard.

18 Examination in Accordance with the Written Scheme

The department responsible for the pressure system must ensure that it is examined within the specified time stated by the competent person or should take it out of use until such time as the examination has been carried out.

The department must also ensure that any necessary preparatory work to enable the examination to take place safely is also carried out. Details of this could be included in the written scheme and depending on the type of system, the following may be required:

- Cooling the system
- Positively isolating the parts of the system to be examined
- Returning the system to ambient conditions
- Removing the contents
- Venting vessels
- Erecting suitable staging for access
- Removing protective devices
- Ensuring that, where appropriate, vessels, pipework etc. are visible and accessible (e.g. by removing brickwork or lagging)
- Cleaning surfaces
- Removing scale and other deposits
- Removing pieces of insulation
- Ensuring that any ancillary testing equipment is available
- Arranging for the system to be tested (e.g. for leaks) where appropriate

19 Operating Instructions

Any person operating a pressure system should be provided with complete operating instructions for the system to ensure its safe operation and should ensure that the system is only

operated in accordance with the instructions given.

Manufacturer's/supplier's instructions can be used where they are appropriate to the particular installation, consistent with the user operating requirements and are sufficiently comprehensive.

The instructions should include all information which the operators need for ensuring safety and should cover items such as:

- Start up and shut down procedures
- Precautions needed during stand-by operation
- Likely fluctuations which may occur in normal operation
- Function and effect of controls
- Procedures to be followed in the case of emergency.

Instructions should be readily available to operators and should be brought to their attention before first use of the system. It may be useful to display simple and concise instructions near the relevant part of the system where they can easily be seen by the operator.

Appendix C contains further details of instructions for the following types of systems:

- Steam and pressurised hot water plant
- Compressed air systems
- Systems incorporating quick opening or bolted doors for access

20 Safe Operating Limits

Any department responsible for the safe operation of a pressure system must know the safe limits of operation of the system and ensure that it is operated within those limits. The system should not be used until the safe operating limits have been identified.

The exactly limits which need to be specified for a particular system will depend on the circumstances and the complexity of the system. Some small simple systems may need little more than the establishment of the maximum pressure for safe operation. However, a complex, large system is likely to need a wide range of conditions specified, e.g. maximum and minimum temperatures and pressures, volumes and flow rates of contents, operating times, heat input or coolant flow etc. In all cases the safe operating limits should incorporate a suitable margin of safety which should be based on current good engineering practice

Where the system is a standard production item, these limits will usually have been determined by the manufacturer. If the department is involved in specifying the design of an item, then a competent person must establish the actual safe operating limits.

Any person using a pressure system must be provided with written information covering its safe operating limits.

21 Protective Devices

The department responsible for the operation of any pressure system must be familiar with any devices fitted to protect against its failure.

Arrangements should be in place to ensure that where required, the necessary checks, maintenance and examinations are carried out on protective devices to ensure they remain operational.

22 Maintenance

Any GoJ department using an installed or mobile pressure system is required to maintain the system in a state of good repair to prevent danger.

The maintenance required and the frequency should be determined through risk assessment, taking into account:

- The manufacturer's recommendations
- The age of the system
- The intensity of use
- The operating environment
- The risks to health and safety in the event of failure.

Account should also be taken of any relevant records available such as running hours of the system, results of examinations by the competent person, routine checks and inspections and any repair or modifications. Where manufacturer's/supplier's instructions are appropriate to the system and sufficiently comprehensive they should be used.

Consideration should be given to which parts of the system require routine, regular checks and replacement e.g. lubricating fluids and coolants often need to be regularly topped up or changed.

Some parts of systems should be subject to sample inspection during regular shut downs when signs of deterioration such as leakage, external damage or corrosion are apparent. Pipework systems for instance may not be subject to examination under the written scheme, but periodic checks are necessary at particularly vulnerable areas such as expansion loops, bends and low points.

Some systems should be subject to a formal preventative maintenance programme to ensure that they are kept in a safe condition and systems which have been out of service for a significant time will need more detailed checks and maintenance before being returned to service.

Where protective devices are liable to be rendered ineffective by accumulations of deposits of waste material evolved during process operations, frequent checks will be needed to maintain the protective devices in efficient working order. Experience will dictate the frequency of such checks.

The method by which maintenance staff are provided with the instructions which are needed to ensure proper maintenance, will depend on the complexity of the system and the department's organisational arrangements. For example, a simple maintenance schedule could take the form of a check list located at the systems concerned..

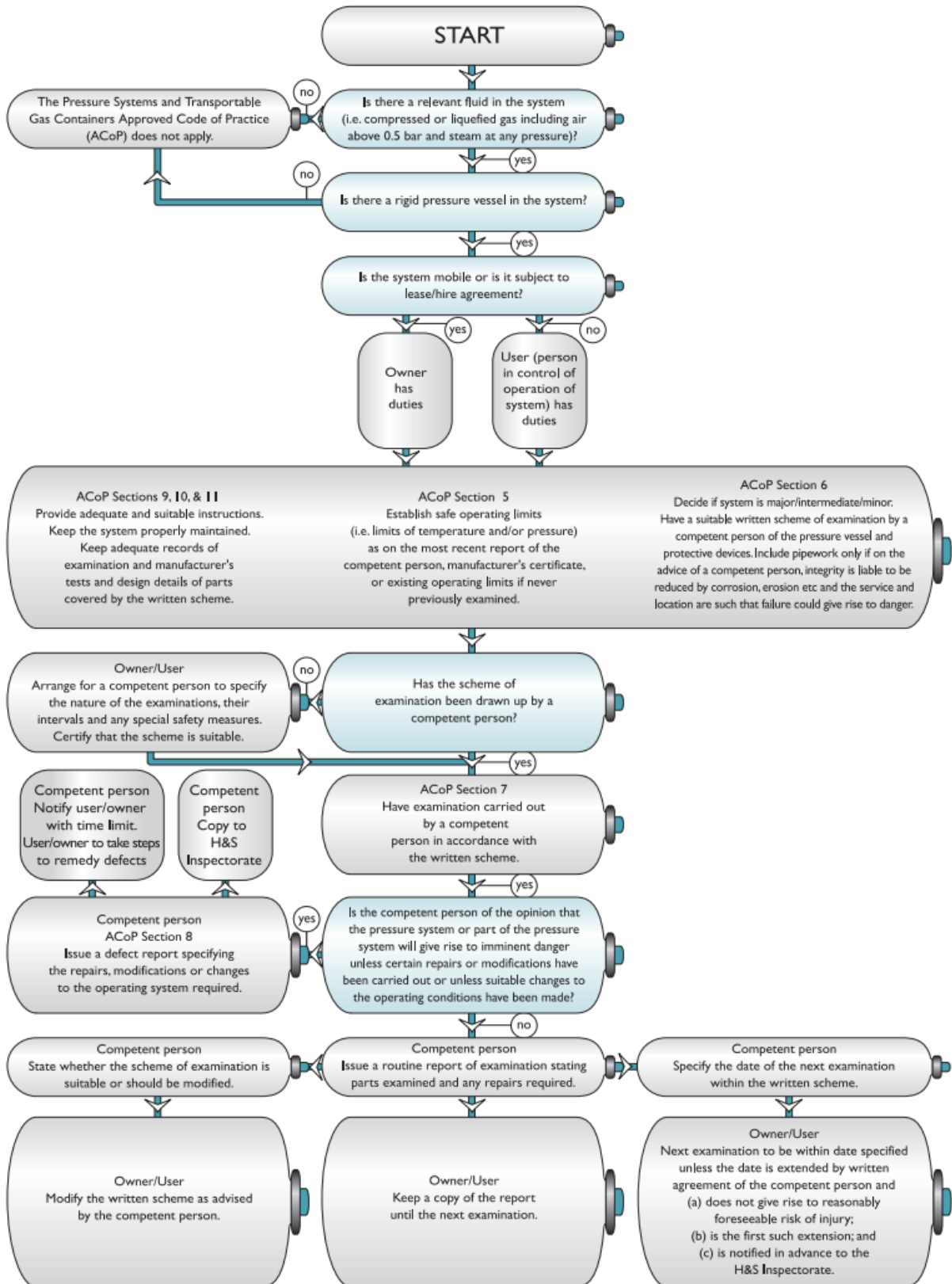
23 Repairs and Modifications

Any repairs or modifications of a pressure system must be carried out by a competent person who has the necessary knowledge and skill to carry out such work.

Any proposed modifications should be discussed with the manufacturer prior to being carried out to ensure that the safety or performance of the system will not be adversely affected.

Checks should be made with the appointed competent person referred to in Section 14 to determine whether a further examination is required by a competent person before the system is taken back into use.

Duties of Users and Owner



Attributes of the Competent Person

Category	Staff	Specialist Services	Organisation
Minor Systems	At least one member of staff qualified to technician engineer level with adequate relevant experience and knowledge of the law, codes of practice, examination and inspection techniques and understanding of the effects of operation for the system concerned.	Established access to basic design and plant operation advice, materials engineering and non-destructive testing (NDT) facilities.	Sufficient organisation to ensure a reasonable data storage and retrieval system with ready access to relevant law, technical standards and codes.
Intermediate Systems	Depending on the complexity of the system, at least one senior member of staff to be of chartered engineer or equivalent status in each relevant discipline and supported by technically qualified and experienced staff with knowledge of the law, codes of practice, examination and inspection techniques and understanding of the effects of operation for the system concerned.	In-house or clearly established access to materials engineering, NDT, design and plant operating advice.	Clear supervisory arrangements - an adequate degree of formal organisation. Appropriate data storage and retrieval system with ready access to relevant law, technical codes and standards.
Major Systems	Depending on the complexity of the system, at least one senior member of staff to be of chartered engineer or equivalent status in each relevant discipline and supported by technically qualified and experienced staff with knowledge of the law, codes of practice, examination and inspection techniques and understanding of the effects of operation for the system concerned.	In-house or clearly established access to the full range of relevant specialist services in the fields of materials engineering, NDT, design and plant operation.	Formal structure and clear lines of authority and responsibility set out in a written statement. Formal recruitment and training policies for staff. Effective data storage and retrieval system with ready access to relevant law, technical codes and standards.

User Operating Instructions

Steam and pressurised hot water plant

Pre-firing and start up instructions should include:

- Methods of establishing the proper water level in the boiler and maintaining adequate water supplies
- Methods of carrying out any necessary flue gas side purging
- Methods of establishing correct firing conditions in order that pressure/temperature are raised carefully, preventing undue thermal shock
- Procedures to avoid water hammer.

There should be instructions covering:

- The feed water treatment, if appropriate
- The safe blow down of the boiler and any other part of the system requiring such treatment
- The precautions to be taken when emptying the boiler, e.g. by allowing it to cool down sufficiently before emptying it
- precautions to ensure positive isolation and depressurisation of one boiler from a common header and blowdown system if internal access is required*
- precautions to be taken before carrying out maintenance operations. This will include the requirement to ensure that the system is normally depressurised before carrying out maintenance and that protective devices are not disconnected or isolated while the plant is operating; and
- The procedures to be followed in the event of a shortage of water, bursting of tubes or other event requiring the boiler to be shut down.

* Where internal access is required and the steam boiler is one of a range of two or more boilers, this will include the requirement to either:

- a) disconnect all inlets through which steam or hot water might enter the boiler from any part of the range; or
- b) close and securely lock all valves or taps controlling the entry of steam or hot water. Where the boiler has a blow-off pipe in common with one or more other boilers or delivers into a common blow-off vessel or sump, it should only be possible to open the blow-off valve or tap on each boiler with a key which cannot be removed until the valve or tap is closed. There should only be one key in use for that set of blow-off valves or taps.

Compressed air systems

The instructions should at least cover such of the following items as are relevant to the system:

- The pre-start checks to be carried out
- The circumstances in which the compressor should be shut down, e.g. when specified operating limits are exceeded
- Clear and concise instructions on the emergency shut down procedure
- Instructions for checking and topping up of compressor lubricants

Appendix C

- Instructions for draining of receivers, intercoolers, aftercoolers, pipework, etc.
- Instructions regarding the keeping of operating logs or running records
- The purpose and operation of protective devices
- Instructions regarding the need for good housekeeping, in particular where dirt and/or spillage may affect the operation of or obscure any protective devices
- Warnings of the dangers associated with the removal of inspection covers or pipework before residual pressure has been vented
- Instructions on the thorough cleaning of receivers at the time of examination.

Vessels fitted with quick opening or bolted doors for access during a process cycle

The following should be part of the instructions:

- The procedure for checking the door locking mechanisms in the open and closed positions
- The procedure for tightening and releasing the securing bolts of multi-bolted doors
- The procedure for verifying that venting is complete before attempting to disengage the door securing mechanism
- Information on the dangers of forcing the doors into position and of bypassing or interfering with door mechanism