LEAFLET 30

SAFE USE OF PRESSURE EQUIPMENT AND SYSTEMS

CONTENTS

LEAFLET FOR LINE MANAGERS

STATUTORY REQUIREMENT

1 This leaflet is to provide guidance, which, if followed will enable line managers within MOD to comply, where required, with the Pressure Systems Safety Regulations 2000 (PSSR), which came into force on 21st February 2000. The Regulations are backed by an Approved Code of Practice issued by the Health and Safety Commission. Certain pressure systems are exempt the Regulations and these are detailed in the Guidance to this leaflet.

2 The Regulations are complex and require qualified and competent engineering staff both to plan and implement the requirement.

POLICY

3 The Regulations apply to the MOD in the UK. In overseas commands the Regulations are to be applied, unless local legislation sets higher standards in which case local law will take precedence. Where the pressure equipment and systems form part of the Defence Estate, the DE MOD Safety Rules and Procedures for work on boilers and pressure systems (SR&P 02) apply and must be complied with.

4 In all other circumstances, pressure systems used by MOD, but not covered by the Regulations are to be assessed for the risk posed and suitable precautions taken to protect MoD employees, or anyone who may be affected by MoD activities.

DEFINITIONS

Pressure system

5 A system comprising one or more pressure vessels of rigid construction, including any associated pipework and protective devices, which contains, or is intended to contain, a relevant fluid;

6 The pipework, along with it's protective devices, to which a gas container is, or is intended, to be connected; and is used, or is intended to be used, to contain a relevant fluid.

Pressure vessel

7 A closed vessel consisting of one or more independent chambers, any of which may be subject to an internal pressure greater than 0.5 Bar and is used, or is intended to be used, to contain a relevant fluid.

Pipework

8 A pipe, or system of pipes, together with associated valves, pumps, compressors and other pressure containing components, including protective devices, hoses or bellows

Protective device

9 Any device(s) designed to protect the pressure system against system failure, and any device(s) designated to give warning that system failure might occur.

Design pressure

10 The pressure used to determine the equipment/pressure vessel design in terms of material type, thickness etc.

Working pressure

11 The operating pressure of the particular system or equipment. This pressure is such that it will allow the relevant equipment to work safely at a pressure below the set pressure where the protective devices will operate.

Written Scheme of Examination

12 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'. Typical contents of a written scheme would include:

12.1 Identification Reference of the item of plant or equipment;

12.2 Those parts of the item which are to be examined;

12.3 The nature of the examination required;

12.4 Any preparatory work necessary before the item can be examined;

12.5 The maximum interval between each examination;

12.6 The critical parts of the system, or equipment, which must be examined following any modification or renewal before the system is used again;

12.7 The name of the authorising body or person certifying the written scheme of examination;

12.8 The date of certification.

Relevant fluid

13 Means in relation to a pressure system

13.1 Steam;

13.2 Any fluid or mixture of fluids which is at a pressure greater than 0.5 bar above atmospheric pressure, and which fluid or mixture of fluids is:

13.2.1 A gas, or

13.2.2 A liquid which would have a vapour pressure greater than 0.5 bar above atmospheric pressure when in equilibrium with its vapour at either the actual temperature of the liquid or 17.5 degrees celsius; or

13.3 A gas dissolved under pressure in a solvent contained in a porous substance at ambient temperature and which could be released from the solvent without the application of heat;

14 Some examples are:

14.1 A compressed or liquefied gas, including air.

14.2 Pressurised hot water above 110^{o} C.

14.3 Steam at any pressure.

Line manager

15 All MOD staff, both Service and Civilian, who have authority and responsibility for directing and supervising people working for them. The working staff maybe either permanent or temporary MOD employed staff, or persons employed on MOD contracts

RIDDOR

16 The Reporting of Injuries Diseases and Dangerous Occurrences Regulations 1995, as amended.

Competent Person

17 For the scope of this leaflet, the definition will mean an individual, or a body of persons with sufficient knowledge training and experience to carry out the duties required. In the PSSR the requirement to comply with the duties placed on competent persons, is placed on the employer of the individual/persons, not the individual/s, unless they are self-employed. Defence Estates SR&P 02 requires the competent person to be independent from all other activities associated with the pressure system such as design, manufacture, operation and maintenance. See also Annex B.

DUTIES

Directors, Heads of Establishments and Commanding Officers

18 Are required to review their existing procedures of design, installation, maintenance, and procurement of pressure systems to ensure that they comply with the Regulations.

19 Have in place procedures to ensure that all the necessary records indicated in this leaflet are available.

Line managers

20 Identify any pressure equipment and related systems within his/her area of responsibility.

21 Where required, provide safe and suitable equipment. This will include suitable protective devices.

22 Know the operating conditions. Before operating a pressure system the line manager must ensure, where required, a written scheme of examination is prepared, or certified, by a competent person. This a requirement of the Regulations, however, where there is an exemption from the Regulations, a suitable system of examination must be implemented to ensure that the pressure system is free from defect and can be used safely.

23 Make provision for suitable training and ensure that the equipment is operated in accordance with this training and supply the operators with information on the operating limits of the system.

24 Ensure, for equipment within their responsibility, a maintenance system is in place in order to maintain the system in good condition and prevent danger. The required frequency and type of maintenance should be assessed and a suitable maintenance programme put in place.

25 Have the system examined under the Written Scheme of Examination prepared for the system. Where such examination is to be carried out, the line manager should ensure that any preparatory work is undertaken so that the competent person may safely carry out the examination;

26 If the competent person issues a report to say that the pressure system, or any associated component is defective (and presents an imminent danger), the line manager shall ensure that such system, or component, is not used until the necessary repairs, modifications and/or changes have been made.

27 If in the UK report to the HSE, under RIDDOR, if there is any incident which involves an explosion, collapse or bursting of any pressure equipment and associated system, regardless of whether or not there is personal injury. This is a defined Dangerous Occurrence under RIDDOR

RECORDS

28 Users and owners must keep the following documents:

28.1 Documents relating to the design of the system, where this information is concerned with parts of the system subject to the Written Scheme of Examination

28.2 The last report from the Written Scheme of Examination;

28.3 Previous such reports if they will assist in assessing whether:

28.3.1 The system is safe to operate, or

28.3.2 Any repairs or modifications can be carried out safely;

28.4 Any agreement between the competent person and the user/owner for postponement of the next examination.

28.5 Documents recording details of an approved system of examination if there is no Written Scheme of Examination, as required by the Regulations.

29 The documents should be kept at the premises where the system is installed. If the user/owner of the system changes, the documents should be passed to the new user/owner.

RELATED PUBLICATIONS

30 Related Publications

- Safety of Pressure Systems Approved Code of Practice ISBN 0-7176-1767-X

RELATED LEAFLETS

31 Related Leaflets

- Leaflet - Emergency and Disaster Planning Strategy
- Leaflet - The Purchase and Safe Use of Work Equipment
- Leaflet - Work in Confined Spaces
- Leaflet - Permit to Work
- Leaflet - Reporting of MOD Accidents and Incidents to the HSE

LEAFLET 30 ANNEX A

SAFE USE OF PRESSURE EQUIPMENT AND SYSTEMS

CONTENTS

GUIDANCE FOR LINE MANAGERS

GENERAL

1 Equipment or systems containing a fluid or gas under pressure can cause death, or injury, to people if the contents are released unexpectedly or uncontrollably. They can also cause serious damage to property. The information contained within this leaflet is for the general information of any line manager in relation to the safe use of pressure equipment and systems. It is not intended to be comprehensive in detail, any further detail will be provided by a competent person.

EXAMPLES

2 Typical examples of pressure equipment systems include:

2.1 Boilers and steam heating systems

2.2 Gas/Air cylinders

2.3 Process plant, pipework and flexible hoses

2.4 Air compressor sets (fixed and portable)

2.5 Heat exchangers and refrigeration plant;

2.6 Level gauges and pressure gauges;

2.7 Pumps and compressors

2.8 Valves and filters

2.9 Pressure cookers, autoclaves and retorts

3 This list is not exhaustive, a line manager would need to consider all the equipment within their area of authority and decide if it is, or forms part of, a pressure system.

EXEMPTIONS

4 Certain pressure equipment and systems are exempt from the requirements of the regulations. Some important ones are listed below, a full list is given in Annex B:

4.1 Where it forms part of the equipment of a British or foreign merchant ship

4.2 A warship or other craft in service of the Crown, e.g. fleet auxiliary

4.3 An aircraft or similar craft

4.4 Where it forms part of a braking, control or suspension system of a wheeled, tracked or rail mounted vehicle

4.5 Any pressure system which forms part, or is intended to form part of a weapons system

4.6 An electrical or telecommunications cable

4.7 Any part of a tool or appliance designed to be held in the hand, which is a pressure system

4.8 A water cooling system on an internal combustion engine or compressor

MAIN HAZARDS

5 Main Hazards may include:

5.1 Impact from an explosive release of compressed gas or fluid;

5.2 Impact from any parts of the equipment that fail or any flying debris;

5.3 Contact with the released gas or fluid, such as steam or chemicals;

5.4 Fire resulting from the escape of flammable liquids.

6 In turn, these hazards arise as a result of an incident, of which the principal causes are:

6.1 Poor equipment and/or system design

6.2 Incorrect installation

6.3 Poor maintenance and testing of equipment

6.4 Inadequate repairs or modifications

6.5 Lack of a suitable safe system of work

6.6 Operator error, poor training/supervision

INSTRUCTIONS

7 Line manager should address the procedures and information needed so that instructions can be supplied so that the system can be safely operated. This must include any special procedures to be followed in the event of an emergency.

8 These instructions should include:

8.1 Start-up and shut down procedures

8.2 Precautions for standby operation

8.3 Function and effect of controls and protective devices

8.4 Likely fluctuations expected in normal operation

8.5 The requirement to make sure that the system is sufficiently protected against overpressure at all times

8.6 Procedures in the event of an emergency

9 It is good practice, for other than the simplest system, for line managers to provide a flow diagram of the system, including all controls, valves, safe operating limits etc. with those items of importance in an emergency clearly identified. The diagram is to be updated when any changes are made to the system.

PREPARATORY WORKS

10 Where required, preparatory works, prior to a competent person's examination, should address:

10.1 Cooling the system

10.2 Positively isolating the parts to be examined

10.3 Returning the system to ambient conditions

10.4 Removing the contents

10.5 Venting vessels

10.6 Erecting suitable staging for access

10.7 Removing protective devices

10.8 Ensuring vessels, pipework etc are visible and accessible

10.9 Cleaning surfaces

10.10 Removing scale and other deposits

10.11 Removing pieces of insulation

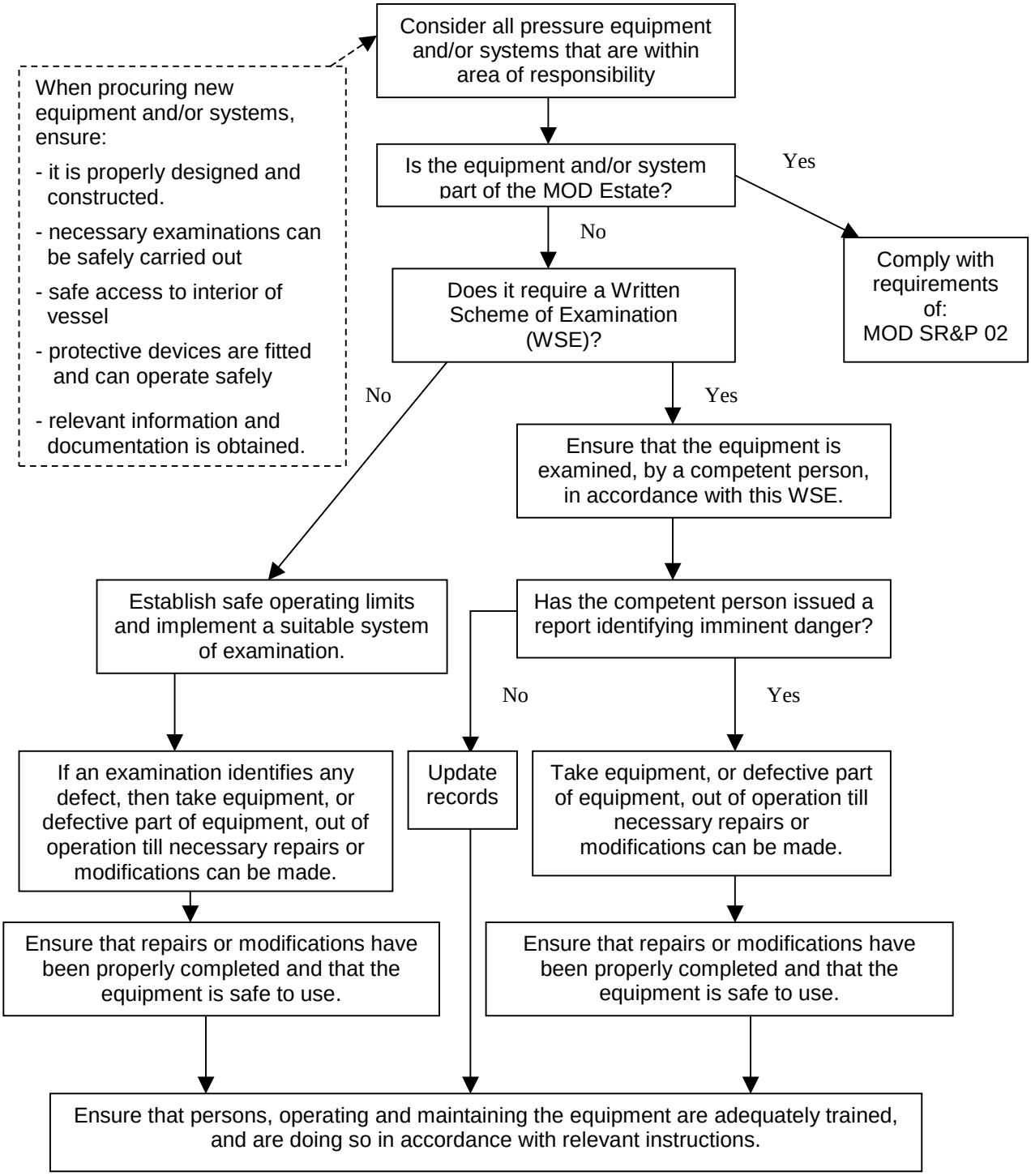
10.12 Making sure that ancillary testing equipment is available

10.13 Arranging testing of the system

LEAFLET 30 ANNEX A APPENDIX 1

SAFE USE OF PRESSURE EQUIPMENT AND SYSTEMS

FLOW CHART



LEAFLET 30 ANNEX B

SAFE USE OF PRESSURE EQUIPMENT AND SYSTEMS

CONTENTS

GUIDANCE ON THE PRESSURE SYSTEMS SAFETY REGULATIONS 2000

COMPETENT PERSONS

1 The term 'competent person' is used in connection with two distinct functions concerning the safety of pressure systems:

1.1 Drawing up or certifying schemes of examination; and

1.2 Carrying out examinations under the scheme.

2 This does not mean that they have to be carried out by different competent persons. In addition, the user/owner may seek advice from a competent person on other matters relating to these regulations. For example, advice could be sought on the scope of the written scheme. In such circumstances, a competent person would be acting solely as an adviser, rather than as a competent person as defined.

3 It is the responsibility of the user/owner to select a competent person capable of carrying out the duties in a proper manner with sufficient expertise in the particular type of system. In some cases, the necessary expertise will lie within the user's/owner's own organisation. Where the competent person is a direct employee of the user's/owner's organisation, there should be a suitable degree of independence from the operating functions of the organisation. In particular, where the staff are provided from an in-house inspection department and carry out functions in addition to their competent person duties, they should be separately accountable under their job descriptions for their activities as competent persons. They should act in an objective and professional manner with no conflict of interests and should give an impartial assessment of the nature and condition of the system. In such cases, the user/owner is acting as competent person and is responsible for compliance with the regulations. However, where an organisation does not have sufficient in-house expertise, they should use a suitably qualified and experienced independent competent person.

4 Whether the competent person is drawn from within the user's/owner's organisation or from outside, they should have sufficient understanding of the systems in question to enable them to draw up schemes of examination or certify them as suitable.

5 A competent person capable of drawing up schemes of examination or examining a simple system may not have the expertise, knowledge and experience to act as competent person for more complex systems. For a number of systems, including the larger or more complex, it is unlikely that one individual will have sufficient knowledge and expertise to act on their own. A competent person should be chosen who has available a team of employees with the necessary breadth of knowledge and experience.

6 In general terms, the competent person should have:

6.1 Staff with practical and theoretical knowledge and actual experience of the relevant systems;

6.2 Access to specialist services;

6.3 Effective support and professional expertise within their organisation; and

6.4 Proper standards of professional probity.

7 The competent person is responsible for all examinations. For example, where ancillary examination methods (e.g. non-destructive testing) are undertaken by another person or body, the competent person should accept responsibility for the results of these tests and their interpretation.

DESIGN AND CONSTRUCTION (REGULATION 4)

8 Designers and manufacturers should consider at the manufacturing stage both the purpose of the plant and the means of ensuring compliance with the regulations.

9 The designer, manufacturer, importer or supplier should consider and take due account of the following, where applicable:

9.1 The expected working life (the design life) of the system;

9.2 The properties of the contained fluid;

9.3 All extreme operating conditions including start-up, shutdown and reasonably foreseeable fault or emergency conditions;

9.4 The need for system examination to ensure continued integrity throughout its design life;

9.5 Any foreseeable changes to the design conditions;

9.6 Conditions for standby operation;

9.7 Protection against system failure, using suitable measuring, control and protective devices as appropriate;

9.8 Suitable materials for each component part;

9.9 The external forces expected to be exerted on the system including thermal loads and wind loading; and

9.10 Safe access for operation, maintenance and examination, including the fitting of access (e.g. door) safety devices or suitable guards, as appropriate.

10 Further recommended practice, where appropriate, on these points is given below.

Properties of the fluid

11 The system should be designed to avoid as far as possible the accumulation of liquids, condensates or sediment in pipework. For example, the design of a compressed air system or of steam pipework should minimise the number of places, such as low points, where liquid can accumulate and should provide for adequate drainage. If necessary, devices should be fitted at appropriate points in the system to allow venting of vapour and/or to prevent a vacuum forming. All pipework drainage should be to a safe place.

12 Special considerations will apply if the pressure vessel is to be used for low temperature storage, e.g. liquid nitrogen, or a highly corrosive material. It may also be necessary to specify any process materials which should not be put into the system because of incompatibility with the construction materials.

Extreme operating conditions

13 Account should be taken of the most onerous combination of temperature, pressure and other relevant parameters to which the equipment may be subjected under reasonably foreseeable circumstances. These should include the conditions which will exist during start-up, shutdown and stand-by operation.

Examination requirements

14 Vessels should be provided with suitably sized openings, including manholes and handholes where appropriate, to allow adequate examination of the interior. Where internal examination may be unnecessary or even harmful, for instance because of size or the hazardous nature of the fluid contained within the system, the designer should consider what examinations are needed and provide adequate means for this to be carried out.

Foreseeable changes

15 These may include allowances for corrosion if some corrosion is foreseeable and unavoidable, or for wear if stirrers or agitators are liable to cause wear which may give rise to danger. The designer should ensure that the system can safely withstand the consequences of any reasonably foreseeable fault or emergency conditions unless it is to be fitted with appropriate control and protective equipment which will either prevent the conditions arising or enable the stored energy to be safely dissipated.

Protection against failure

16 Every plant item in which the pressure can exceed the safe operating limit (i.e. those which have not been designed to withstand the maximum pressure which can be generated within the system) should be protected, whenever operational, by at least one pressure-relieving or pressure-limiting device. The device should be suitable for its intended duty and should be fitted as close as practicable to the plant item it is designed to protect. Sufficient devices should be fitted at other points to ensure that the pressures inside the system do not exceed the safe operating limits. In the event of a pressure relief device operating, the design should enable the contents to be released in as safe a manner as is practicable.

17 Where part of the system has a lower safe operating limit than other parts, suitable pressure-reducing valves, safety valves, pressure relief and indicating devices should be provided.

18 Some equipment, for example steam receivers, may not necessarily need individual safety valves. However, it should not be possible to isolate them from the device which is providing protection if the source of pressure can still be applied.

19 Suitable measuring or indicating devices should be provided to give clear indications of relevant critical conditions within the system, e.g. temperatures, pressures, liquid levels. The display of any measuring equipment should be clearly visible. It should be possible to see when safe operating limits are being reached. Suitable moisture filters and/or drains should be provided where moisture would adversely affect the integrity of the system or the operation of any protective device.

20 Equipment, such as boilers, in which a low level (or into which a low flow rate) of water could lead to unsafe conditions should be fitted with at least one suitable water level indicator and to an alarm which sounds when the water level drops to a predetermined value. The indicator should be connected directly to the equipment. Fusible plugs should only be used as the sole low water alarm when other types of low water alarm are not practicable. They should be fitted at the point or points where overheating is first likely to occur if the water level drops. The gauge glasses of tubular water level gauges should be effectively protected to prevent injury from the effects of the glass breaking and the contents being ejected.

21 The pressure-relieving device should be so designed that it will deal adequately, where appropriate, with the dynamic flow characteristics of those fluids which result in two phase flow conditions.

22 The devices and associated inlet and outlet pipework should have an adequate discharge capacity in order to limit pressure to within the safe operating limits. It should reach full discharge capacity within a set limit of overpressure (accumulation). The normal operating pressure of the system should be sufficiently below the setting of the protective device to prevent its premature operation.

Construction materials

23 Materials used in construction should be suitable for the intended use. For example, steam boiler stop (crown) valves made from flake graphite (grey) cast iron are not recommended. Account should be taken of the intended duty of the valve, including pressure, temperature, size, frequency of use, nature of contents and any particular foreseeable fault conditions, when selecting valves. The direction of opening and closing should preferably be indicated on valves.

24 Plastic pipes are often used on compressed air systems. However, not all plastics are suitable for use where there is the possibility of their becoming brittle or otherwise damaged due to exposure to heat or other adverse conditions.

External forces

25 Account should be taken of any external forces which could affect the integrity of the equipment. These may include the forces exerted on pipework from thermal expansion and contraction, externally applied loads or any reasonably foreseeable vibration or shock loading, for example from water hammer. Suitable expansion bends and/or joints and drains should be incorporated in the pipework as necessary.

Safe access

26 Any equipment such as an autoclave to which regular access is required during process operations, e.g. for loading and unloading, should be provided with suitable door safety devices. The function of these devices is to securely fasten any door while it is subjected to internal pressure and thereby prevent the risk of the door being violently blown open. The devices should ensure that the vessel cannot be pressurised until the door is securely closed. It should not be possible to open the door until the internal pressure has been fully and suitably vented to atmospheric pressure. The door should be restrained for the first part of its travel until the seal has been broken.

27 Where access is required for the use of tools such as rakes or scrapers and where physical access to the plant item and the area around the door is prevented by an effective guard, this would be a satisfactory alternative way of meeting the pressure interlock requirements.

PROVISION OF INFORMATION AND MARKING (REGULATION 5)

28 The designer or supplier of a pressure system or component part covered by this regulation should consider the most effective way of providing the appropriate information to those who need it.

29 Additional information about pressure vessels and information relevant to the whole system (apart from that already required to be provided by the manufacturer) should be provided in writing. The purpose being to provide users/owners with sufficient information on the design, construction, examination, operation and maintenance of the equipment to enable them to comply with the requirements of these regulations. The designer or supplier should use their judgement, knowledge and experience to decide what information is required. Although it is not possible to give a complete list of all the information which might be needed the following items should be considered where relevant:

29.1 Design standards used and evidence of compliance with national/european/international standards or documentation showing conformity;

29.2 Design pressures (maximum and minimum);

29.3 Fatigue life;

29.4 Design temperatures (maximum and minimum);

29.5 Creep life;

29.6 Intended contents, especially where the design has been carried out for a specific process;

29.7 Flow rates and discharge capacities;

29.8 Corrosion allowances;

29.9 Wall thickness;

29.10 Volume capacities, especially for storage vessels. Depending on the intended contents these may be expressed as maximum volume, pressure or filling ratio; and

29.11 Materials of construction.

30 Manufacturers and importers of pressure vessels are required to mark or attach a plate to all pressure vessels in legible and idelible form with the following information.

30.1 The manufacturer's name.

30.2 A serial number to identify the vessel.

30.3 The date of manufacture of the vessel.

30.4 The standard to which the vessel was built.

30.5 The maximum allowable pressure of the vessel.

30.6 The minimum allowable pressure of the vessel where it is other than atmospheric.

30.7 The design temperature.

INSTALLATION (REGULATION 6)

31 When planning the installation, the employer of the installer should ensure that all of the following items which are relevant to the system are actioned (this list is not exhaustive and additional actions may be needed depending on the type of system, its location, and planned operating conditions):

31.1 Ensure that those doing the installation have the required training, skills and experience;

31.2 Provide adequate supervision, taking into account the complexity of the system being installed;

31.3 Prepare suitable foundations 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;

31.4 Decide on the most suitable method of lifting and handling the vessel(s), protective devices and pipework so as to avoid accidental damage;

31.5 Check for signs of damage in transit;

31.6 Protect the system from adverse weather conditions before and during installation;

31.7 Remove any protective packaging carefully before commissioning;

31.8 Ensure that any hot work such as welding or cutting will not affect the integrity of the system;

31.9 Ensure that protective devices are clear of obstruction, operate correctly without hindrance or blockage and that the discharge is routed to a safe place;

31.10 Ensure that any access doors/hatches are clear of obstruction and operate correctly;

31.11 Ensure that any labels or markings attached to the system are clearly visible;

31.12 Provide adequate access for maintenance and examination purposes;

31.13 Provide suitable physical protection against mechanical damage, e.g. accidental impact by vehicles;

31.14 Allow sufficient space for access around and beneath valves, in particular drain valves;

31.15 Clear away any debris such as metal shavings or dust arising from the installation process; and

31.16 Have the installation work checked and approved on completion by a suitably qualified person.

Compressed air systems

32 Additional points which should be noted for compressed air systems are:

32.1 The installation site should provide a well-ventilated, cool and clean air environment;

32.2 Intercoolers and aftercoolers should, where they are cooled by air, be located so that the air flow over their surfaces is not obstructed;

32.3 Inlet air should be drawn from an area which is free from potentially flammable or corrosive concentrations of fumes or vapours; and

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

SAFE OPERATING LIMITS (REGULATION 7)

Establishing the limits

33 Where the system consists of a standard production item, the designer/manufacturer should assess the safe operating limits and pass the relevant information to the user/owner. In these circumstances, the user/owner will not always need to carry out the detailed work required to establish the safe operating limits of the system. In cases where the user/owner has specified the design, the responsibility for establishing the safe operating limits rests with the user/owner.

34 If the user/owner does not have sufficient technical expertise to establish the safe operating limits, an organisation which is competent to carry out the task should be used.

35 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.

Record keeping

36 A suitable system for recording and retaining information about safe operating limits and any changes to them should be used. Where the limits have been specified by the designer or manufacturer, then the operating manual supplied with the system should be used to pass on the information. Larger or more complex systems may have the information recorded in several documents. Whatever method is used, the information should be readily available to those people who need it, including the competent person responsible for the examinations in accordance with the written scheme. It is recommended that the details of the safe operating limits are made available to the person operating the system and retained with the documents required to be kept

37 For mobile systems the owner must provide the user with a written statement detailing the safe operating limits or ensure that this information is clearly marked on the equipment. Where the system is likely to be on hire for long periods, both a written statement and durable marking are preferable. This should ensure that information about the safe operating limits is always readily available.

Second-hand systems

38 Second-hand equipment should be thoroughly assessed so that users/owners are satisfied that the safe operating limits have been established correctly. Often the original design information is not available and, even when it is, the equipment may have deteriorated to an extent where the current safe operating limits are below the original design values.

Review

39 Users/owners should ensure that the safe operating limits specified for a system are kept up to date. They should be reviewed at the time of examinations under the written scheme, when significant repairs or modifications are carried out or where there are major changes to the operating conditions, e.g. a change in the relevant fluid contained within the system. If the safe operating limits are altered, the discharge capacity of the pressure-relieving devices should be reviewed to ensure that the system is adequately protected against overpressure at all times.

WRITTEN SCHEME OF EXAMINATION (REGULATION 8)

40 Before a pressure system is operated the user/owner must ensure that a written scheme of examination has been prepared. The written scheme of examination should be drawn up by a competent person, or if drawn up by someone other than a competent person, certified as suitable by a competent person.

Attributes and role of competent persons

41 The level of expertise needed by the competent person depends on the size and complexity of the system in question. To illustrate the level of expertise, knowledge and experience needed in different circumstances, pressure systems are divided into three categories. However, in practice there are no clear dividing lines. The three categories should be taken as an indication of the range of systems covered rather than providing clear cut divisions. Each system should be individually assessed and an informed decision made on which of the categories is the most appropriate.

42 The three categories are as follows:

43 Minor systems include those containing steam, pressurised hot water, compressed air, inert gases or fluorocarbon refrigerants which are small and present few engineering problems. The pressure (above atmospheric pressure) should be less than 20 bar (2.0 MPa) (except for systems with a direct-fired heat source when it should be less than 2 bar (200 kpa)). The pressure-volume product for the largest vessel should be less than 2×10^5 bar litres (20 MPa m^3). 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. Pipelines are not included.

44 Intermediate systems include the majority of storage systems and process systems which do not fall into either of the other two categories. Pipelines are included unless they fall into the major system category.

45 Major systems are those which because of their size, complexity or hazardous contents 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 (100 MPa m^3) and any manufacturing or chemical reaction system where the pressure-volume product for the largest pressure vessel is more than 10^5 bar litres (10 MPa m^3). Pipelines are included if the pressure-volume product is greater than 10^5 bar litres.

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

Minor systems

Staff

47 At least one member of staff qualified to incorporated 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.

Specialist services

48 Established access to basic design and plant operation advice, materials engineering and non-destructive testing (ndt) facilities.

Organisation

49 Sufficient organisation to ensure a reasonable document storage and retrieval system with ready access to relevant law, technical standards and codes.

Intermediate systems

Staff

50 Depending on the complexity of the system, at least one senior member of staff 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.

Specialist services

51 In-house or clearly established access to materials engineering, ndt, design and plant operating advice.

Organisation

52 Clear supervisory arrangements with an adequate degree of formal organisation. Appropriate document storage and retrieval system with ready access to relevant law, technical codes and standards.

Major systems

Staff

53 Depending on the complexity of the system, at least one senior member of staff 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.

Specialist services

54 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.

Organisation

55 Formal structure and clear lines of authority and responsibility set out in a written statement. Formal recruitment and training policies for staff. Effective document storage and retrieval system with ready access to relevant law, technical codes and standards.

Drawing up the written scheme of examination

56 The written scheme of examination can be written and certified as suitable either by an independent competent person or by the in-house competent person. For either function,

57 Where the appropriate technical expertise exists in-house, the written scheme may be drawn up by the user of the system and certified as suitable by a competent individual within their own organisation provided they fulfil the requirements for a competent person. Alternatively, there may be sufficient in-house expertise to draw up the scheme but not certify it, in which case the user should employ an independent competent person to carry out the certification.

58 The competent person should ensure that the written scheme specifies:

58.1 Which parts of the pressure system need to be subject to examination, i.e. the scope as defined by the user/owner; and

58.2 What types of examination are necessary and the intervals between them, i.e. the content.

Scope

59 The responsibility for ensuring the scope of the written scheme of examination is suitable rests with the user/owner. The user/owner should first establish which parts of the pressure system are pressure vessels, protective devices, or pipework as defined in the regulations, and then decide which parts of the system should be included in the written scheme. The following guidelines should be used:

59.1 In general, pressure vessels should be included (it might be reasonable to exclude small vessels with low stored energy which form part of a larger system);

59.2 All protective devices should be included, even if they are on a part of the system which is not included;

59.3 Pipework, which is widely defined to include pipes, associated valves, pumps, compressors, hoses, bellows and other pressure-containing components, will only need to be included in the scheme if:

59.4 Its mechanical integrity is liable to be significantly reduced by corrosion, erosion, fatigue or any other factors; and

59.5 Failure resulting in the sudden release of stored energy would give rise to danger.

60 The user/owner should be able to justify any decision to exclude parts of the system from the scope of the written scheme. To arrive at a properly informed decision, and particularly where parts of the system are to be excluded from the written scheme, users or owners should seek advice from a person with the appropriate and relevant technical expertise and experience. Such a person need not be a competent person as defined in these regulations. But the person advising on the scope of the written scheme must have an appropriate level of expertise and experience of the particular type of system. The user/owner may choose to seek advice on this matter from a competent person.

Content

61 At least the following information should be included in the written scheme of examination:

those parts of the system which are to be examined;

61.1 Identification of the item of plant or equipment;

61.2 The nature of the examination required, including the inspection and testing to be carried out on any protective devices;

61.3 The preparatory work necessary to enable the item to be examined safely;

61.4 Specify what examination is necessary before the system is first used, where appropriate;

61.5 The maximum interval between examinations;

61.6 The critical parts of the system which, if modified or repaired, should be examined by a competent person before it is used again;

61.7 The name of the competent person certifying the written scheme; and

61.8 The date of the certification.

62 The nature of the examination should be specified in the written scheme. This may vary from out-of-service examination with the system stripped down, to in-service examination with the system running under normal operating conditions. Some systems (for example fired equipment) may need to undergo both out-of-service and in-service examinations. The competent person may need to seek advice from the manufacturer/supplier on appropriate methods of testing, particularly where internal examination is difficult.

First examination

63 Where appropriate, the requirement for an examination before the system is first taken into use should be specified in the written scheme of examination. For equipment supplied in accordance with the Pressure Equipment Regulations 1999, the person who draws up or certifies the written scheme should consider whether an initial examination is appropriate and the form that any such examination should take. This consideration should take account of the results of the conformity assessment to which the equipment was subject before it was placed on the market. In general, further assessment of the equipment under the written scheme should be judged on the merits of each individual case.

Periodicity

64 When deciding on the periodicity between examinations, the aim should be to ensure that sufficient examinations are carried out to identify at an early stage any deterioration or malfunction which is likely to affect the safe operation of the system. Different parts of the system may be examined at different intervals, depending on the degree of risk associated with each part.

65 Protective devices should be examined at least at the same time and frequency as the plant to which they are fitted. Some protective devices may need to be examined at more frequent intervals. The examination should include checks that the devices function correctly and are properly calibrated or, alternatively, that they have been replaced by recently tested units.

66 All relevant factors should be taken into account when deciding on the appropriate interval between examinations, including:

66.1 The safety record and previous history of the system;

66.2 Any generic information available about the particular type of system;

66.3 Its current condition, e.g. due to corrosion/erosion etc (internal and external);

66.4 The expected operating conditions (especially any particularly arduous conditions);

66.5 The quality of fluids used in the system;

66.6 The standard of technical supervision, operation, maintenance and inspection in the user's/owner's organisation; and

66.7 The applicability of any on-stream monitoring.

Repair/modification

67 The scheme should, where necessary, specify the type of repair or modification which need to be examined by the competent person carrying out examinations under regulation 9 before the system is put back into use. Alternatively, the user/owner may decide to draw up a comprehensive written method to be followed for certain specified repairs or modifications to all or some of the systems.

Storage

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

EXAMINATION TO THE SCHEME (REGULATION 9)

69 The user/owner should ensure that any necessary preparatory work is completed so that the competent person can carry out the examination safely. Preparatory works may be specified to a greater or lesser extent in the written scheme. Whether any special preparatory works form part of the written scheme or not, the user/owner should consider the type of preparations required, seeking advice from a suitably qualified person where necessary. According to the type of system, the preparatory works may need to include:

69.1 Cooling the system;

69.2 Positively isolating the parts of the system to be examined;

69.3 Returning the system to ambient conditions;

69.4 Removing the contents;

69.5 Venting vessels;

69.6 Erecting suitable staging for access;

69.7 Removing protective devices;

69.8 Ensuring that, where appropriate, vessels, pipework etc are visible and accessible (i.e. by removing brickwork or lagging);

69.9 Cleaning surfaces;

69.10 Removing scale and other deposits;

69.11 Removing pieces of insulation;

69.12 Ensuring that any ancillary testing equipment is available; and

69.13 Arranging for the system to be tested (for example for leaks) where appropriate.

70 The competent person should have sufficient practical and theoretical knowledge and actual experience of the type of system under examination to enable defects or weaknesses to be identified and an assessment made of their significance in terms of the integrity and safety of the equipment.

71 The competent person should examine and report on all parts of the system covered by the written scheme of examination. The competent person should be satisfied that, as a result of the examination, the condition of the parts included in the written scheme and their fitness for continued use has been properly assessed. The following points (although not exhaustive) should aid the competent person's decisions:

71.1 The age and known history of the part or system;

71.2 The nature of the relevant fluid;

71.3 The conditions of use;

71.4 The length of time since the last examination; and

71.5 The expected operating conditions and maintenance regime until the date of the next examination.

72 Unless the user or owner informs the competent person of an intended change of use, the assessment of the system's fitness should be based on the current operating conditions and method of use continuing unchanged. The competent person should assume that normal maintenance will be carried out.

73 The report should be based on the actual condition of the system as found during the examination. If repairs are carried out as a result of the examination, the report should include details of the fault and the remedial action taken even if the repair works are finished before the examination has been completed.

74 The competent person should consider whether any changes are needed in the safe operating limits, or in the scheme of examination. The report may state that continued use of the system is dependent on altering certain specified operating conditions or undertaking specific maintenance tasks.

75 The competent person may decide that the risk of danger may be significantly increased if the next examination is delayed until a date set in accordance with the current written scheme. In these circumstances, the written scheme should be reviewed and an earlier date set beyond which the system should not be operated without a further examination.

76 At the end of the examination, the competent person should be satisfied that the protective devices, especially any safety valves, have been tested and set correctly. Where protective devices which have been removed during an examination are found to be defective, the cause of the problem should be investigated further by the user/owner and the necessary corrective measures taken.

ACTIONS IN THE CASE OF IMMENENT DANGER (REGULATION 10)

77 If a competent person in the course of an examination carried out under a written scheme is of the opinion that the pressure system or part of the pressure system will give rise to imminent danger unless certain repairs or modifications are carried out, they are to forthwith make a written report identifying the system and specifying the repairs, modification or changes required. The report is to be supplied to:

77.1 The user of an installed system; or

77.2 The owner and the user of a mobile system

78 Within 14 days provide a written report with the details to the HSE for the area where the system is situated.

79 On receipt of such a report the user of the pressure system is to ensure that it is not operated, and the owner of a mobile system shall take all practicable steps to ensure the system is not operated, until such time as the repairs etc have been carried out

OPERATION (REGULATION 11)

80 The instructions provided to operators by the user/owner should cover:

80.1 All procedures and information needed so that the system can be operated safely; and

80.2 Any special procedures to be followed in the event of an emergency.

81 Information provided by manufacturers or suppliers such as instruction sheets and operating manuals may form part or all of the instructions developed to meet these regulations. To fulfil this role they should be sufficiently comprehensive, cover the particular installation and its safe operation and be consistent with the site operating conditions.

82 The operator should be familiar with and have ready access to all the instructions. Instructions should be presented in the most appropriate way, e.g. simple, concise instructions may be displayed near the relevant part of the system. These should be pointed out to the operator before they use it for the first time.

83 Where a system is leased, the owner should provide all necessary instructions to the user. The user should ensure that the system is only operated in accordance with the instructions.

Content

84 The instructions should contain all the information needed for the safe operation of the system including:

84.1 Start-up and shutdown procedures;

84.2 Precautions for standby operation;

84.3 Function and effect of controls and protective devices;

84.4 Likely fluctuations expected in normal operation;

84.5 The requirement to ensure that the system is adequately protected against overpressure at all times; and

84.6 Procedures in the event of an emergency.

85 The following paragraphs give more detailed guidance on the contents of instructions for particular types of systems.

Steam and pressurised hot water plant

86 Pre-firing and start-up instructions should include:

86.1 Methods of establishing the proper water level in the boiler and maintaining adequate water supplies;

86.2 Methods of carrying out any necessary flue gas side purging;

86.3 Methods of establishing correct firing conditions so that pressure/temperature are raised carefully, preventing undue thermal shock; and

86.4 Procedures to avoid water hammer.

87 There should also be instructions covering:

87.1 Feed water treatment, if appropriate;

87.2 Safe blowdown of the boiler and any other part of the system requiring such treatment;

87.3 Precautions to be taken when emptying the boiler, e.g. by allowing it to cool down sufficiently before emptying it;

87.4 Precautions to ensure positive isolation and depressurisation of one boiler from a common header and blowdown system if internal access is required;

87.5 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

87.6 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.

88 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:

88.1 Disconnect all inlets through which steam or hot water might enter the boiler from any part of the range; or

88.2 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

89 The instructions should cover at least all of the following items relevant to the particular system:

89.1 Checking and topping up of compressor lubricants;

89.2 Draining of receivers, intercoolers, aftercoolers, pipework etc;

89.3 Need for good housekeeping, in particular where dirt and/or spillage may affect the operation of or obscure any protective devices;

89.4 Warnings of the dangers associated with the removal of inspection covers or pipework before residual pressure has been vented; and

89.5 Thorough cleaning of receivers at the time of examination.

Vessels with quick-opening or bolted access doors

90 Instructions for vessels with quick-opening or bolted doors for access during a process cycle should include:

90.1 Information on the dangers of forcing the doors into position and of bypassing or interfering with door mechanisms;

90.2 Checks on door locking mechanisms in the open and closed positions;

90.3 Tightening and releasing the securing bolts of multi-bolted doors; and

90.4 Checking that venting is complete before attempting to disengage the door-securing mechanism.

MAINTENANCE (REGULATION 12)

91 The type and frequency of maintenance for the system should be assessed and a suitable maintenance programme planned.

92 A suitable maintenance programme should take account of:

92.1 The age of the system;

92.2 The operating/process conditions;

92.3 The working environment;

92.4 The manufacturer's/supplier's instructions;

92.5 Any previous maintenance history;

92.6 Reports of examinations carried out under the written scheme of examination by the competent person;

92.7 The results of other relevant inspections (e.g. for maintenance or operational purposes);

92.8 Repairs or modifications to the system; and

92.9 The risks to health and safety from failure or deterioration.

93 Problems identified during operation of the system should be assessed for their impact on the safety of the system. For instance, recurrent discharge of a relief valve may indicate that the system or the relief valve are not working correctly and should be investigated as part of the planned maintenance regime. In processes where protective devices and other safeguards may become ineffective because of accumulations of deposits of process waste materials, frequent checks should be made to keep them in efficient working order. For example, in the case of digesters in by-product plants, regular checks should be made on the interlocking components and seals of doors to ensure that they operate correctly. Moving parts should be regularly lubricated and protective devices cleared of fatty deposits.

94 Where the manufacturer/supplier has provided maintenance instructions for all or part of the system, these should form the basis of the maintenance programme. They should be supplemented as appropriate where they are not sufficiently comprehensive to cover the particular installation. In assessing whether the manufacturer's/supplier's instructions are sufficient, account should be taken of the complexity of the system, whether they cover the particular installation and reflect the on-site operating conditions.

95 The type and frequency of maintenance tasks (inspections, replacement of parts etc) should be decided for all those parts which, through failure or malfunction, would affect the safe operation of the system. Although pipework systems may not always be included for examination under the written scheme, checks and remedial action in potentially vulnerable areas such as expansion loops, bends, dead legs and low points or where leaks have been noticed will be necessary. Where appropriate, parts of systems should be checked during regular shutdowns when it may be easier to identify signs of deterioration such as leakage, external damage or corrosion, particularly if the equipment or pipework is lagged.

96 Systems which have been out of service for a significant period of time will need detailed checks and maintenance before being returned to service, irrespective of any examinations carried out under the written scheme.

Instructions

97 Instructions for maintenance staff should be readily available. The method used to provide staff with instructions will depend on the complexity of the system and the user's organisational arrangements. For example, a simple maintenance schedule could take the form of a checklist displayed near to the system. The aim should be to select the most appropriate method, taking into account all the relevant factors.

MODIFICATION AND REPAIR (REGULATION 13)

98 When designing any modifications (including extensions or additions) or repairs to the pressurised parts of the system, whether temporary or permanent, the following should be taken into account:

98.1 The original design specification;

98.2 The duty for which the system is to be used after the repair or modification, including any change in relevant fluid;

98.3 The effects any such work may have on the integrity of the pressure system;

98.4 Whether the protective devices are still adequate; and

98.5 Continued suitability of the written scheme of examination.

98.6 Repair or modification of non-pressure containing parts of the system should be carried out so that the integrity of the pressure system is not adversely affected. This should ensure that any repairs, modifications (including extensions or additions) do not affect the operation of any protective devices.

99 Any repair or modification (including extensions or additions) should be designed in accordance with appropriate standards, taking into account the expected future duty of the system as well as the original design specification. It should be done by a person competent to do such work.

KEEPING OF RECORDS (REGULATION 14)

100 Records retained should assist the competent person in the examination under the written scheme, the purpose being to assess whether the system is safe for continued use and/or if any planned repairs or modifications can be carried out safely.

101 The user/owner should keep the following documents readily available:

101.1 Any designer's/manufacturer's/supplier's documents relating to parts of the system included in the written scheme;

101.2 Any documents required to be kept by the pressure equipment regulations 1999;

101.3 The most recent examination report produced by the competent person under the written scheme of examination;

101.4 Any agreement or notification relating to postponement of the most recent examination under the written scheme; and

101.5 All other reports which contain information relevant to the assessment of matters of safety.

101.6 In deciding whether a report contains relevant information, the user/owner should take account of the content of the report, the system's complexity, the operating conditions, previous history of repair and any significant modifications to the system.

102 Records of abnormal or particularly arduous operating conditions should be kept if they will be of use to the competent person at the next examination.

103 Where the owner/user is unsure whether certain records are relevant, the competent person should be asked to advise.

104 To avoid confusion, the records should be kept in such a way that it is possible to identify the particular system or parts of the system easily against those detailed in the written scheme of examination.

PRESSURE SYSTEMS EXEMPT THE REGULATIONS

105 Schedule 1 of the regulations lists a number of general exceptions which significantly affect their application.

Exceptions 1 and 2

106 These exceptions cover systems which form part of the equipment of a ship. Also covered are weapons systems, and any aircraft or similar craft.

Exception 3

107 The regulations do not cover pressure systems which form part of the braking, control or suspension system of road or rail vehicles. No internal combustion engine is considered to be covered by the regulations.

Exception 4

108 A system which is only a pressure system because it is subject to a leak test is not covered by the regulations. For example, radiators under leak test would be exempt.

109 The exception also covers situations where pressurisation is unintentional and not reasonably foreseeable. This is not a blanket exception to cover situations where the hazard should have been foreseen but was not. Proper enquiry is necessary to determine the safe operating limits when new plant or processes are developed. Protective measures should be designed into the plant if loss of process control can lead to excess pressure generation within the system.

110 Also exempt from the regulations are pipelines normally used for conveyance of liquids but which are pressurised solely as part of a test or line clearance operation.

Exception 5

111 The definition of a pressure system includes 'a pipeline containing a relevant fluid'. This exception excludes from the regulations low pressure gas distribution pipelines provided that:

111.1 The operating pressure does not exceed 2 bar above atmospheric pressure; and

111.2 A protective device prevents the pressure from exceeding a maximum of 2.7 bar above atmospheric pressure in the event of a temporary pressure excursion occurring.

Exception 6

112 Where pressurised apparatus has been set up in a laboratory and is itself the subject of a research experiment, it may not be reasonably practicable to apply most of the regulations to the equipment. In the case of other research projects the individual circumstances and duration of the project will dictate whether it is reasonably practicable to comply with the regulations. However, anyone relying on this exception should be able to justify their reasons for non-compliance and any failure to take the basic precautions required under the regulations to prevent risk of injury from system failure.

Exception 7

113 Plant and equipment used in diving projects is already the subject of requirements under the Diving at Work Regulations 1997. Plant and equipment required by regulation 6(3)(b) of those regulations are exempted from the pressure systems safety regulations. The wording 'intended to be used' is inserted to extend the exception to manufacturer's premises where the diving equipment may be under test.

Exception 8

114 The regulations do not apply to any working chamber, tunnel, manlock or airlock in which people work in compressed air and which are covered by the Work in Compressed Air Regulations 1996. If pressure systems such as mobile compressors and air receivers are provided on the surface or are taken into the working chamber, tunnel, manlock or airlock for work activities, then these pressure systems fall within the scope of the pressure systems safety regulations.

Exception 9

115 A road tanker or tank container is exempt from the provisions of these regulations while the Carriage of Dangerous Goods by Road Regulations 1996 apply. This should prevent overlapping requirements. However, if the tank or tank container ceases to be subject to those regulations, the pressure systems safety regulations will apply when a relevant fluid is carried. But examinations of vessels carried out under the Carriage of Dangerous Goods by Road Regulations 1996 will be acceptable as providing compliance with the relevant requirements in the pressure systems safety regulations.

116 It should be noted that certain pressurised tankers containing nonhazardous materials which are not subject to the carriage of dangerous goods by road regulations 1996 will be mobile systems under the pressure systems safety regulations and will need to be examined accordingly.

Exceptions 10, 11, 12, 13 and 14

117 These exceptions relate to international road, rail and sea transportation involving a pressure system. Broadly, such international transport operations are exempt from the provisions of the United Kingdom Regulations if full compliance is achieved with the relevant international agreements, which have broadly similar objectives to UK legislation. To be exempt, however, the transport operation has to be international, i.e. the consignment concerned has to be on an international journey which begins or ends abroad.

Exception 15

118 This provision exempts from the regulations the fuel storage tank and fuel system of a vehicle which uses a relevant fluid for propulsion and also exempts other pressure systems found on a vehicle such as those for heating, cooking, ventilation and refrigeration.

Exception 16

119 This paragraph confirms the exception of pressurised water cooling systems both for internal combustion engines and compressors. The regulations do not apply to a pressure system which is part of a braking, control or suspension system of a vehicle (exception 3) or to prime movers which are pressure vessels (exception 20).

Exception 17

120 The exception clause for tyres has been inserted to make it clear that a tyre should not be considered a rigid vessel, and so brought within the scope of the regulations.

Exception 18

121 This exception excludes small refrigeration systems from the regulations.

Exception 19

122 The exception for slurry tankers relates only to those tankers which are used in agriculture.

Exception 20

123 This exception disapplies the regulations to prime movers, which includes turbines and prime movers of steam locomotives. The exception would also cover pressurised pit support systems used in the mining industry.

Exception 21

124 Some electrical and telecommunications systems incorporate cables which are pressurised with air in excess of 0.5 bar above atmospheric pressure. Such cables are not to be treated as part of a pressure system as defined. However, some systems incorporate a compressor and conventional air receiver and the regulations will apply to that part of the pressure system.

Exception 22

125 Certain types of switchgear forming part of high-voltage electrical apparatus containing sulphur hexafluoride gas are covered by a specific exception. This type of equipment is manufactured for long service; it is not intended to be opened up and internal examination might increase the risk of electrical failure in service.

Exception 23

126 Water-filled fluid couplings are used extensively for conveyor systems subject to very heavy duty such as in mines. Under certain circumstances, steam can be generated in them, and larger couplings would then be subject to these regulations unless excepted. Such couplings, which are not constructed as pressure vessels, are invariably fitted with suitable protective devices to prevent system failure, and the requirements of the regulations are inappropriate.

Exception 24

127 Portable fire extinguishers manufactured as pressure vessels (i.e. not transportable pressure receptacles) are excluded from the regulations if they have a working pressure below 25 bar (gauge) at 60°c, and have a total mass not exceeding 23 kilograms. However, fixed (installed) fire extinguishing systems containing a relevant fluid are subject to the regulations as a pressure system.

Exception 25

128 Hand-held tools which otherwise might be considered as pressure vessels, and therefore covered by the regulations, are excepted provided that the hand-held part of the tool contains the pressure vessel. This exception would mostly apply to small, compressed air-driven tools. Tools where the pressure vessel is not part of the hand-held portion (such as steam strippers where the steam is generated in a tank) are not exempted from these regulations.

PRESSURE SYSTEMS EXEMPTED FROM CERTAIN REGULATIONS

Exception 1

129 Pressure equipment which is subject to the Pressure Equipment Regulations 1999 (PER) is exempted from regulations on design, construction (Reg 4) and provisions for information (Reg 5(1)) and marking (Reg 5(4)). One example of equipment not covered by this exception is systems containing steam at a pressure of 0.5 bar (gauge) or less.

Exception 2

130 This exception relates only to pressure systems containing a relevant fluid other than steam where the product of the pressure (in bars) and the internal volume (in litres) in each vessel in the system is less than 250 bar litres. Where the relevant fluid is steam all the regulations apply, irrespective of the vessel pressure and size. The exemption is only applied to Regulations 5 (marking the vessel), 8, 9, 10 and 14

Exceptions 3 and 4

131 These exceptions have been inserted to ensure that tank containers subject to the Carriage of Dangerous Goods by Road Regulations 1996 and examined under the provisions of those regulations are not subject to the corresponding provisions of the pressure systems safety regulations when they have been removed from a vehicle. However, the operational provisions of the pressure systems safety regulations will continue to apply. The Regulations that do not apply in this case is Regulations 4, 5, 7, 8, 9, 10, 13 and 14

Modification of duties in cases where pressure systems are supplied by way of lease, hire, or other arrangements

132 This allows a person who supplies an installed system by way of lease or hire, to be responsible for discharging the duties of the user under all the provisions of regulations 8(1) and (2), 9(1), 11(1), 12 and 14, but only if the supplier agrees in writing. (Have the Written Scheme prepared, have the system examined, provide information for operation, have the system maintained, and keep the records)

132.1 During such time as the agreement is in force the supplier shall discharge the duties of the user under the said provisions.

132.2 It shall be a defence in any proceedings against the user of an installed system -

132.3 For an offence for a contravention of any of the said provisions; or

132.4 In any civil proceedings for breach of duty,

132.5 For that person to prove that the supplier had agreed in writing to be responsible for discharging the user's duty at the relevant time.

132.6 During such time as the agreement is in force the following provisions of this paragraph shall have effect.

132.7 Where the competent person who is to carry out the examination under the scheme of examination is a person other than the supplier, the supplier shall notify the competent person that any reports required to be sent or given to the user under regulation 9 or 10 shall be sent or given to the supplier as well.

132.8 On being so notified under the above paragraph, the competent person shall comply with regulations 9 and 10 as if the reference therein to sending or giving a report to the user also included a reference to sending or giving a report to the supplier.

132.9 On receipt of a report from a competent person under regulation 9 or 10 (or in the case where the supplier is also the competent person, on the making by him of that report) the supplier shall take all practicable steps to ensure that the pressure system will not be operated in contravention of regulation 9 or 10, as the case may be.

133 Where a person supplies a pressure system to another ("the customer") under a hire-purchase agreement, conditional sale agreement, or lease, and:

133.1 He carries on the business of financing the acquisition of goods by others by means of such agreements, or, if financing by means of leases, the use of goods by others;

133.2 In the course of that business he acquired his interest in the pressure system supplied to the customer as a means of financing its acquisition by that customer (or, in the case of a lease, its provision to that customer); and

133.3 In the case of a lease he or his agent either has not had physical possession of that pressure system, or has had physical possession of it only for the purpose of passing it on to the customer,

134 The customer and not the person who provided the finance shall be treated for the purpose of these regulations as being the owner of the pressure system, and duties placed on owners in these regulations shall accordingly fall on the customer and not on the person providing the finance.