



# Piped Compressed Gas Systems attached to Gas Cylinders and Stand-Alone Compressed Gas Cylinder Installations Policy

<b>Originator name:</b>	Clive Parkinson
<b>Section / Dept:</b>	Health and Safety Department
<b>Implementation date:</b>	November 2014
<b>Date of next review:</b>	November 2015
<b>Related policies:</b>	Health and Safety Policy, Hazardous Substances Policy
<b>Policy history:</b>	New Policy

## Version History

Version	Author	Revisions Made	Date
1	Nicola Walker	First issue	October 2014

## Approval History

### Equality Analysis

Version	Reviewed by	Comments	Date
1	Equality & Diversity Staff Member's Jo McCarthy-Holland	Equality Compliant	18 Nov 2014

### Committee Sign Off

Version	Committee Name	Date of Sign Off
1	Health and Safety Committee	20 Nov 2014

<b>1</b>	<b>Introduction</b>
<b>1.1</b>	<b>Purpose</b>
1.1.1	To prevent serious injury to persons and or damage to equipment from the hazard of stored energy as a result of the failure of a piped compressed gas pressure system or, one of the component parts.
<b>1.2</b>	<b>Scope</b>
1.2.1	This policy applies to staff, students, contractors and visitors using piped compressed gas systems and stand-alone cylinder installations. This document is not designed to replace detailed, technical guidance contained within British Compressed Gas Association; CP4, CP23, GN2, GN7.
<b>1.3</b>	<b>Equality Analysis</b>
1.3.1	Consideration is given to the protected characteristics of all people groups identified in the Equality Act 2010. The protected characteristics are gender, age, race, disability, sexual orientation, religion/belief, pregnancy and maternity, and marriage/civil partnership.
<b>1.4</b>	<b>Definitions</b>
1.4.1	Pressure system is defined as; <ul style="list-style-type: none"> <li>• a system comprising of one or more pressure vessel of rigid construction, any associated pipework and protective devices;</li> <li>• the pipework with it protective devices to which a transportable pressure receptacle is, or is intended to be, connected,</li> <li>• or a pipeline and its protective devices.</li> </ul>
1.4.2	A relevant fluid is defined as <ul style="list-style-type: none"> <li>• steam at any pressure</li> <li>• any fluid or mixture of fluids which is at a pressure &gt;0.5bar above atmospheric pressure</li> <li>• a gas dissolved under pressure in a solvent (acetylene)</li> </ul>
1.4.3	<b>Training and Briefing</b>  Training is equipping staff, students (and others where the University has a duty-of-care) with relevant skills to deal appropriately with a given Health and Safety situation. Briefing is informing such persons of relevant knowledge in relation to Health and Safety. Training and briefing will be made available in a range of formats according to the needs of the trainee and different groups of staff, students and others.
1.4.4	<b>Accessibility</b> The duty to make reasonable adjustments, as far as possible, to ensure that all staff and students (and others where the University has a duty-of-care) with a disability have equal access to everything they need to do a job or studies as those persons without a disability.

<b>1.5</b>	<b>Legislative context</b>
1.5.1	<p>This policy compiles with the requirements of the Health and Safety at Work Act 1974 and the Pressure System Safety Regulations 2000 (PSSR2000).</p> <p>Before using any qualifying pressure equipment (new or otherwise), as defined above a written scheme of examination (WSE) must be in place, and an examination undertaken.</p>
	<p><b>Insurance Requirements</b> – It is a requirement of the University Insurance providers that the University follow the Guidance and Recommendations of the relevant professional bodies for example the British Compressed Gas Association (BCGA)</p> <p><b>British Compressed Gas Association Recommendations</b></p> <p>Due to the increased dangers associated with the use of stand-alone compressed gas cylinders located in buildings in the event of a fire, the preferred method of providing compressed gas within the University is via piped systems attached to gas cylinders securely housed outside the building. This is in compliance with recommended guidance from the British Compressed Gas Association (BCGA) and that of the Fire Service.</p> <p>The use of stand-alone cylinders within laboratories will only be sanctioned in the following circumstances</p> <ul style="list-style-type: none"> <li>• Building design, layout or process prevents use of piped gas system; and</li> <li>• Fire risk assessment has formally been reviewed; and where applicable</li> <li>• Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002 assessment has been completed / reviewed.</li> </ul>
<b>1.6</b>	<b>Health &amp; Safety Implications</b>
1.6.1	This Policy forms part of the Health and Safety Policy
<b>2</b>	<b>Policy</b>
<b>2.1</b>	<b>Principles</b>
2.1.1	The University will comply with the Pressure Systems Safety Regulations 2000 (PSSR2000) and the recommendations of the British Compressed Gas Association to ensure all piped compressed gas systems and stand-alone gas cylinders are safe to use.
2.1.2	<p><b>Commitment</b></p> <p>The University will:</p> <ul style="list-style-type: none"> <li>• Appoint a competent person who will authorise all installations and modifications to gas pressure systems. <sup>(appendix 1)</sup></li> <li>• Ensure all piped gas lines are adequately designed, suitable for its intended purpose and installed correctly. <sup>(appendix 2)</sup></li> <li>• The pressure system is designed and manufactured from suitable materials.</li> <li>• Ensure the system can be operated safely.</li> <li>• Fit suitable protective devices and ensure they function correctly.</li> <li>• Make sure that, where fitted, relief valves discharge to a safe place.</li> <li>• Ensure all Written Schemes of Examination are in place and examination undertaken before the system is used. <sup>(Appendix 3)</sup></li> <li>• Ensure that all piped gas lines are adequately managed, inspected and maintained.</li> <li>• Ensure all new installations and modifications to existing installations are undertaken by a competent person.</li> </ul>

	<ul style="list-style-type: none"> <li>• Ensure a robust justification process for gas cylinders located in laboratories and work areas. <sup>(appendix 4)</sup></li> <li>• Ensure modifications to gas lines are adequately designed and approved by a competent person. <sup>(appendix 5)</sup></li> <li>• Ensure all users of compressed gas pressure systems receive suitable and sufficient training. <sup>(appendix 6)</sup></li> <li>• Ensure appropriate user checks are undertaken and recorded. <sup>(appendix 7)</sup></li> </ul>
<b>2.2</b>	<b>Procedures</b>
2.2.1	<p><b><u>Piped Compressed gas systems attached to gas cylinders</u></b></p> <p><b><u>ROLES and RESPONSIBILITIES</u></b></p> <p>In line with the University of Surrey Management of Contractors policy only authorised directors <sup>(appendix 1)</sup> are permitted to authorise construction work. <sup>(appendix 2)</sup></p> <p>Roles and responsibilities of Responsible persons within the University of Surrey for piped compressed gas systems attached to gas cylinders;</p> <p><b><u>Director of Estates and Facility's Management</u></b></p> <p>The Director of EFM is responsible for the provision of adequate resources to achieve the following;</p> <ul style="list-style-type: none"> <li>• The installation*, management, maintenance and inspection of piped compressed gas systems attached to pressure cylinders.</li> <li>• Repair to any part of the compressed piped gas line or equipment due to failure or damage.</li> <li>• Appointment of the competent person for the coordination of this activity.</li> <li>• Advising Faculties and Directorate of inspection and maintenance, schedules in a timely manner.</li> <li>• Keeping of all records with regards to installation, inspection and maintenance of the piped gas systems.</li> <li>• Supply a copy of inspection documentation to the respective faculties on request.</li> <li>• Inform and advise faculties in a timely manner of any failures and defects highlighted within routine or other inspections.</li> <li>• Installation* and maintenance of appropriate oxygen depletion monitoring detectors.</li> </ul> <p>The competent person within EFM will be the primary contact for Faculties and Directorates with regards to piped compressed gas systems attached to gas cylinders.</p> <p>*Installation as defined CDM 2007 Regulations <sup>(appendix2)</sup></p> <p><b><u>Faculties and Departments</u></b></p> <p>Faculties and Directorates are responsible for appointing a responsible person to liaise with the appointed competent person within EFM with regards to piped</p>

compressed gas systems.

Faculties and departments are responsible for the provision of adequate resources to achieve the following;

- Initial installation of piped compressed gas line.
- Provision of Written Scheme of Examination<sup>(appendix 3)</sup>
- Revision to existing Written Scheme of Examination following modification to existing piped compressed gas line.
- Upgrade to manifolds and associated equipment as required by and advised within Written Scheme of Examination.
- Upgrade to piped gas line and associated equipment (i.e. whip restraint cables, flash back arrestors, pressure relief valves) as required.
- Upgrade / modification of any part of piped compressed gas line due to change of Regulations or BCGA guidance/recommendations.
- Ensure users of compressed gas supplies undertake required 'user checks'<sup>(appendix 7)</sup>
- Ensuring users of piped compressed gas and stand-alone compressed gas cylinders receive gas safety awareness training<sup>(appendix 6)</sup>
- Maintain training records of users and responsible persons within the faculty or directorate with regard to Gas safety.
- Provision of schematic diagram of any proposed modification to an existing pipe line to the competent person within EFM for approval.<sup>(appendix 5)</sup>
- Ensuring that no modifications to existing lines are undertaken without approval in writing from the competent person within EFM.<sup>(appendix 1)</sup>
- Provision of suitable and sufficient Personal Protective Equipment (PPE).
- Provision of and maintenance of suitable and sufficient equipment to facilitate the safe handling of compressed gas cylinders.
- Risk assessment for the process for which the gas is to be used

### **User of compressed gas systems**

It is the responsibility of users of compressed gases to;

- Attend training<sup>(appendix 6)</sup>
- Undertake User Checks<sup>(appendix 7)</sup> on gas pressure systems and all associated equipment including cylinders before using them.
- Immediately and without delay report any defects/ hazards to their supervisor.
- Wear appropriate personal protective equipment provided.
- Follow safe work practices during handling and storage of gas cylinders
- Follow emergency response procedures if an incident should occur.

### **Health and Safety**

Health and Safety department in consultation with the appointed competent person will be responsible for;

- Reviewing the policy and ensuring it meets current legislative requirements.
- Monitoring compliance with this policy and BCGA recommendations.
- Providing Guidance on Safe use of Piped compressed gas systems to

	<p>Faculties, Directorates and delegated officers.</p> <ul style="list-style-type: none"> <li>• Providing Gas safety awareness training to users of piped compressed gas systems and stand-alone gas cylinders.</li> </ul>
2.2.2	<p><b><u>Standalone gas cylinders in the laboratory/workplace</u></b></p> <p><b><u>ROLES and RESPONSIBILITIES</u></b></p> <p>Roles and responsibilities of Responsible persons within the University of Surrey for stand-alone gas cylinders;</p> <p>Where compressed gas cylinders have been brought into the work area, the responsibility for the cylinder, and all associated equipment, maintenance, inspection and upgrades lies with the solely with the Faculty or Directorate as detailed below.</p> <p>Most stand-alone pressure cylinder installation systems will consist only of a cylinder, regulator and low pressure hose feeding the output of the regulator to the process equipment.</p> <p>Faculties and Directorates are responsible to appointing a responsible person for the management, maintenance and inspection of stand-alone gas cylinders and associated equipment.</p> <p>Faculties and departments are responsible for the provision of adequate resources to achieve the following;</p> <ul style="list-style-type: none"> <li>• Review all cylinders stored within laboratory/work area areas at periodic intervals.</li> <li>• Where the building design and process allows consideration must be given for the provision of piped gas supply from an external store.</li> <li>• Provision of robust justification for the siting of internal cylinders.(appendix 4)</li> <li>• Undertake fire risk assessment and where applicable Dangerous Substances and Explosive Atmosphere Regulations (DSEAR) 2002 (DSEAR).</li> <li>• Consultation with the EFM competent person for the supply of Laboratory gases in new building projects and refurbishments.</li> <li>• Supply, inspection, maintenance and replacement of appropriate and suitable regulators.</li> <li>• Supply, inspection, maintenance and replacement of suitable associated equipment e.g. flash back arrestors, low pressure hose assemblies, valves and fittings.</li> <li>• Upgrade / modification of any part compressed gas line due to change of Regulations or BCGA guidance/recommendations.</li> <li>• Consultation with the responsible person within EFM where supply of gas is required at a pressure 2 Bar and above with regards to suitable fittings and supply.</li> <li>• Consultation with the responsible person within EFM where hose length from cylinder to equipment is greater than 2 Meters.</li> <li>• Ensuring users of stand-alone compressed gas cylinders receive gas safety awareness training.(appendix 6)</li> </ul>

	<ul style="list-style-type: none"> <li>• Provision of suitable and sufficient Personal Protective Equipment (PPE).</li> <li>• Provision of and maintenance of suitable and sufficient equipment to facilitate the safe handling of compressed gas cylinders.</li> </ul> <p>Retention of the Maintenance and Inspection records by the Faculty / Directorate with copies supplied to the competent person with in EFM.</p>
<b>3</b>	<b>Governance Requirements</b>
<b>3.1</b>	<b>Responsibility</b>
3.1.1	This Policy is monitored and regularly reviewed by the Director of Health and Safety.
<b>3.2</b>	<b>Implementation / Communication Plan</b>
3.2.1	The Policy is communicated to all staff, students, contractors and visitors involved with Gas Pressure Systems and Stand-alone compressed gas installations.
<b>3.3</b>	<b>Exceptions to this Policy</b>
3.3.1	Not applicable
<b>3.4</b>	<b>Supporting documentation</b>
3.4.1	See E&FM and Health & Safety Website

## **Appendix 1**

In line with the University of Surrey Management of Contractors policy only authorised directors <sup>(appendix 1)</sup> are permitted to authorise construction work. <sup>(appendix 2)</sup>

University of Surrey Management of Health and Safety for Work Services Contractors Policy 2010.

### **Authorised Directors**

Those listed below are deemed as authorised directors in accordance with this policy

- Director of Estates and Facilities Management
- Development Director Research Park

## **Appendix 2**

According to the Construction (Design and Management) Regulations 2007. 'Construction work' means the carrying out of any building, civil engineering or engineering construction work and includes –

- the installation, commissioning, maintenance, repair or removal of mechanical, electrical, gas, compressed air, hydraulic, telecommunications, computer or similar services which are normally fixed within or to a structure.

## **Appendix 3 - Written Scheme of Examination**

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

### **Written Scheme of Examination**

Typically a Written Scheme will cover the examination of -

- All protective devices.
- All high pressure regulators
- All high pressure hoses and pigtails
- All pipework, which, in the event of failure could give rise to danger.

In addition, there is a requirement for regular inspection / maintenance checks which technically fall outside of the requirements of the Written Scheme of Examination and typically include-

- Before use: Visual examination of the condition of the equipment
- Regular creep test.
- Systems low pressure leak test at normal operating pressures
- Visual and functional check of all system components

Routine replacement of high pressure system components.

### **Written schemes of examination for stand-alone compressed gas cylinder installations**

The HSE has advised owners and users of portable gas (oxy-acetylene or oxy-propane) welding and cutting sets that Written Schemes of Examination are not required. However, it should be noted that such equipment can present a risk of fire or explosion if not assembled, operated and maintained correctly.

In the case of other equipment covered by this guidance, most stand-alone pressure cylinder installation systems will consist only of a cylinder, regulator and low pressure flexible hose feeding the output of the regulator to the process equipment and it is not required to have a Written Scheme of Examination. However in such cases, a documented assessment of the potential risk should be undertaken, and where these results in the recognition that injury could result from a failure of the system, then a Written Scheme of Examination is required to be drawn up.

Where a documented assessment of the potential risk has resulted in recognition that injury could result from a failure of the system and Written Scheme of Examination drawn up



## Appendix 4

### Justification for the use of standalone gas cylinders within the workplace.

Due to the increased dangers associated with the use of stand-alone compressed gas cylinders located in buildings in the event of a fire, the preferred method of providing compressed gas within the University is via piped systems attached to gas cylinders securely housed outside the building. This is in compliance with recommended guidance from the British Compressed Gas Association (BCGA) and that of the Fire Service.

The use of stand-alone cylinders within laboratories will only be sanctioned in the following circumstances

- Building design, layout or process prevents use of piped gas system; and
- Fire risk assessment has formally been reviewed; and where applicable
- Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002 assessment has been completed / reviewed.

Room number:	Faculty / Department

#### 1. List Gases stored in work room

Gas	Cylinder size	Pressure	Volume

### Volume of a compressed gas cylinder

**When the temperature is kept constant, we can derive the equation:**

$$P(1) \times V(1) = P(2) \times V(2)$$

**Where:**

P(1) is the pressure of the compressed gas in the cylinder (psi)

V(1) is the internal volume of the cylinder, often referred to as water volume (litre)\*

P(2) is the atmospheric pressure (1 atm - 14.7 psi)

V(2) is the volume of gas at pressure P (2) (litre)

For example, an AL sized cylinder is filled with nitrogen at 2000 psi. What is the gas volume of nitrogen from the cylinder?

P(1) is 2000 psi

V(1) is the internal volume of AL cylinder 29.5 litre

P(2) is 14.7 psi

V(2) is the unknown volume of gas

**Solving the equation above for V(2) gives:**

$$V(2) = [P(1) \times V(1)]/P(2) = (2000 \text{ psi} \times 29.5 \text{ litres})/14.7 \text{ psi} = 4013 \text{ litres}$$

(approximately 140 cu. ft.)

Justify the size of the cylinder being used:

2. Does the building design or layout prevent the gas being piped in?

YES / NO (If YES state reasons below.)

3. Does the process/application for which the gas is being used prevent the use of piped compressed gas being used?

YES/ NO (If YES describe reasons below)

4. Does the room size require Oxygen depletion Monitoring?

YES/ NO?

If YES is this in place?

YES /NO

If you have answer YES to either Q2 or Q3 please supply suitable and sufficient Fire risk assessment with DSEAR assessment if applicable with this form to Technical Service Manager and H&S advisor / Fire officer if applicable for sign off.

If you answered NO to both Q2 and Q3 then you there is no justification for the compressed gas cylinder to be located within the work area. You need to discuss with Technical Services Manager for your faculty the process to move towards an external piped gas supply.

If the room requires Oxygen depletion monitoring and it is not present – you may not bring the cylinder inside. (Consider smaller cylinder size)

**Sign off**

	Signature	Name	Date
Justification completed by PI or nominated deputy			

**Review of Justification**

	Signature	Name	Date
Justification reviewed by Technical Services Manager			
Additional requirements identified			

**H&S / Fire officer Approval**

**Before** installation of compressed gas cylinder within the workplace/laboratory, suitable and sufficient Fire risk assessment and if required DSEAR assessment has been undertaken and submitted for approval with this justification

	Signature	Name	Date
Justification reviewed by H&S / Fire officer			
Additional requirements identified			

**Copy to Lab safety folder.**

**Appendix 5**



University of Surrey Piped Compressed Gas Change Form Applicable to FIXED compressed lines.					
Requested by:			Date		
Sheet 1 of					
Description of Change (From –To) Include marked up drawings/sketch etc. where required					
Reason for Change					
Drawings/ Written schemes of work affected					
Title	Dwg. no	Revision from to	Title	Dwg. No	Revision from To
Review					
Principle Mechanical Engineer ..... Accept /Reject Date:.....					
Faculty Manager/ Head of Department ..... Accept /Reject Date: .....					
Engineering Change incorporated by..... Date .....					
Operation Procedures Revised by ..... Date .....					

## **Appendix 6- Competencies**

### **Competencies associated with the use, inspection, testing maintenance and installation of piped compressed gas systems attached to gas cylinders.**

#### **Level 1**

Before use checks, carried out by persons who have received sufficient instruction to;

- Operate system safely.
- Changing and handling cylinders

Anticipated competency / training requirement – Successful completion of approved ‘

- ‘Gas Safety Awareness’ course
- Gas safety – Changing of changing of gas cylinders practical
- Manual handling training

E.g. Technical staff, research staff, PhD, Academic staff and visitors.

#### **Level 2**

- Annual Checks (PSR)
- Regulator creep test
- System low-pressure leak test at normal operating pressures
- Visual and functions check of all system components

Anticipated competency / training requirement - Specialist contractors who are registered to BS EN ISO 9001/BS EN ISO 13485, with scope of registration defined to cover maintenance.

**This should be undertaken by Specialist contractor who are registered to BS EN ISO 13485 with scope of registration defined to cover maintenance appointed by EFM in line with the CDM2007 Regulations.**<sup>(appendix2)</sup>

#### **Level 3**

System design, Installation, modification and component replacement should ONLY be undertaken by a person who has undertaken relevant training by a suitably approved provider.

Typically, a person undertaking this training should possess relevant engineering experience and should only be considered competent once a level of practical experience in gas system design and installation has been gained.

Anticipated competency / training requirement — Specialist contractors who are registered to BS EN ISO 9001/BS EN ISO 13485.

**This should be undertaken by Specialist contractor who are registered to BS EN ISO 13485 and appointed by EFM in line with CDM 2007 Regulations.**<sup>(appendix2)</sup>

## **Competencies associated with the use, inspection, testing, and maintenance of stand-alone compressed gas cylinder installation**

### **Level 1**

**Before use checks** *carried out by persons who have received sufficient instruction to operate the system safely.*

Anticipated competency/ training requirement – Successful completion of approved training course

- Gas safety awareness

**Safely change Gas pressure cylinders and fit regulators** *carried out by persons who have received sufficient instruction to operate the system safely.*

Anticipated competency training requirement – Successful completion of approved training course

- Practical management of Gas pressure cylinders'
- Manual Handling'

### **Level 2**

Regulatory inspection of regulators at periodic intervals

The British Compressed Gases Association (BCGA) recommends that pressure regulators are refurbished or replaced with new at least every five years.

Depending on gas properties, the type of application and the frequency of use, this could be necessary more often; for example every 12 to 18 months for some particularly corrosive HCl systems.

Inspection should include;

- certified external inspection, pressure/performance testing
- refurbish/repair-certified internal inspection, new active components, pressure/performance testing and 'same as new' warranty.

Anticipated competency / training requirement – **This should be undertaken by Specialist contractor who are registered to BS EN ISO 13485 with scope of registration defined to cover maintenance appointed by EFM in line with the CDM2007 Regulations.**<sup>(appendix2)</sup>

### **Level 3**

Where there is a requirement to carry out routing limited disassembly / re-assembly of high pressure pipe (greater than 2bar) within an existing system.

Anticipated competency / training requirement – **This should be undertaken by Specialist contractor who are registered to BS EN ISO 13485 appointed by EFM in line with the CDM2007 Regulations.**<sup>(appendix2)</sup>

## **Appendix 7 –User Checks**

Inspection by user – Each time equipment is used

### **Piped compressed gas systems attached to compressed gas cylinder**

- Equipment is in good working order
- Valves shut off and open correctly
- Hoses are compatible with gas in use; reactivity and pressure
- Hoses in good condition e.g. no kinking, twisting or cracking
- Check hoses are secured by non-reusable 'O' type crimp clamps (note –worm type, clamps are not recommended e.g. jubilee clips)
- No oil or grease contamination to hoses or fittings
- System is operating normally.

### **High and low pressure components associated with stand-alone gas cylinder installations**

- Equipment is visually in good order
- Regulator has been in service for less than 5 years
- Valves shut off and open correctly
- Hoses are compatible with gas in use; reactivity and pressure
- Hoses in good condition e.g. no kinking twisting or cracking
- Hoses secured by non-reusable 'O' type crimp clamps (note –worm type, clamps are not recommended e.g. jubilee clips)
- No oil or grease contamination to hoses or fittings
- Bottle support is secure
- System is operating normally

### **Low pressure hoses used in association with piped compressed gas systems attached to pressure cylinders.**

The condition of the hose is of vital importance to safety. Correct hose connections, properly fitted, tested, and retained by suitable non-reusable clips or ferrules, are also essential. Re-useable worm drive clamps (jubilee clips) should NOT be used.

Low pressure hoses shall be –

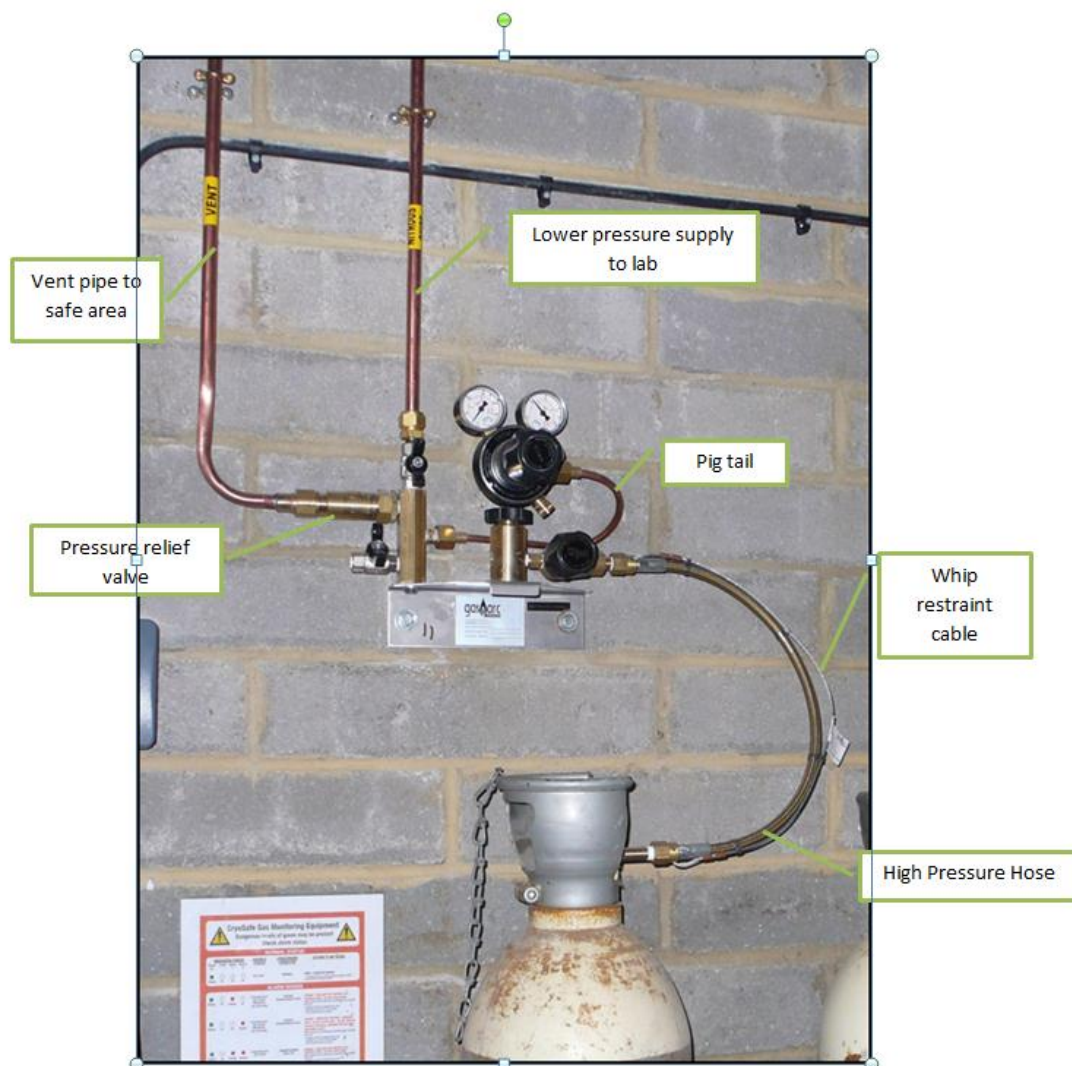
- Capable of safely handling gas pressure applied.
- Made of a material which has been proved to be compatible with the gas used.
- Protected from heat.
- Kept as short as possible.
- Not allowed to become contaminated with grease or other materials.
- Fastened with appropriate fastenings.
- Where multiple low pressure hoses are used in close proximity, a unique marker to include the gas name should be used to identify each end of each hose.
- Oxygen or fuel gas hoses should not be coiled around the cylinders, regulators or cylinder trolley during operation.
- Discarded when worn or damaged.

Hoses and hose assemblies shall conform to the following standards

- BS EN 1327 thermoplastic hoses
- BS EN 559 Rubber hoses
- BS EN ISO 14113 Rubber and plastic hose assemblies (450 bar)
- Hoses to BS 559 shall be assembled and tested in accordance with BS EN 1256
- Hose connections shall conform to BS EN 560
- Quick action coupling shall conform to BS EN 561

## Glossary

### Single Cylinder Manifold and associated components





**Compressed Gas Systems Training Matrix**

		TASK							
<b>TRAINING REQUIREMENT</b>		USER of gas supplied to process equipment	Change cylinders	Routine assembly of low pressure hoses pipes and fittings.	<b>THIRD PARTY SERVICE PROVIDER</b>	Routine limited assembly and disassembly of high pressure pipes within and existing system.	Annual PSR Inspection. Regulator creep test/System low pressure leak test at normal operating pressure. Visual function check of all system components	System design, Installation, modification and component replacement	
	Gas Safety Awareness training	Gas Safety Awareness training	Gas Safety Awareness training	Gas Safety Awareness training					
	Safe moving and Handling cylinder PRACTICAL		Safe moving and Handling cylinder PRACTICAL						
	Manual Handling		Manual Handling						
	<b>THIRD PARTY SERVICE CONTRACTOR _APPOINTED BY EFM</b>					<b>THIRD PARTY SERVICE CONTRACTOR _APPOINTED BY EFM</b>			
	Specialist contractors who are registered to BS EN ISO 9001/BS EN ISO 13485.					Specialist contractors who are registered to BS EN ISO 9001/BS EN ISO 13485.	Specialist contractors who are registered to BS EN ISO 9001/BS EN ISO 13485, with scope of registration defined to cover maintenance.	Specialist contractors who are registered to BS EN ISO 9001/BS EN ISO 13485.	

# Equality Analysis Template

## for all University Policies

<b>Organisational Sign Off by Equality and Diversity Team:</b>	<p><b>NAME OF POLICY: <u>PIPED COMPRESSED GAS SYSTEMS ATTACHED TO GAS CYLINDERS AND STAND-ALONE COMPRESSED GAS CYLINDER INSTALLATIONS POLICY</u></b></p> <p><input checked="" type="checkbox"/> <b>Low Equality Impact (Minor input to Policy to reflect equality considerations)*</b></p> <p><input type="checkbox"/> <b>Medium to High Equality Impact (Equality Analysis template completed)</b></p> <hr/> <p><input checked="" type="checkbox"/> <b>Sign off received</b></p> <p><b>Signed off by:</b> <u>Jo McCarthy-Holland</u></p> <p><b>Position:</b> <u>Equality Adviser</u></p> <p><b>Date:</b> <u>18/11/14</u></p>
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Note: This Template must be used in conjunction with the associated Equality Analysis Guidance Notes, which can be accessed from the [Equality and Diversity Website](#)