



Technical Publication

Pressure Systems Safety Regulations
Guidance Notes for Commercial Customers

Revision 0 issued 1995
Revision 1 issued 06/00
Revision 2 issued 01/05
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The information in this document is intended to give guidance and believed to be accurate and represent good practice at the time of publication. It does not replace the need to consult other formal documents where further information may be required.

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1. Introduction.

The Pressure Systems and Transportable Gas Containers Regulations 1989, SI 1989 No. 2169 came into force in stages, starting in July 1990 with final full implementation on 1st July, 1994. They were superseded by the Pressure Systems Safety Regulations 2000, SI 2000 No. 128, which came into force on 21st February 2000. These in turn have been amended by the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009. (NOTE: This amendment has no real practical effect on the issues covered by this guidance booklet)

These regulations, hereafter referred to as PSSR in this booklet, place statutory duties on people or companies who design, install, own and use certain types of pressurised equipment at places of work.

The PSSR does not apply to pressure systems that are owned, or used by people not at work.

This booklet is intended to explain, in fairly simple terms:

- a) If the PSSR applies to a liquefied petroleum gas (LPG) system installed at your premises;
- b) If they do apply, how the PSSR affect you.

The PSSR are complex regulations, so this simple guide cannot cover all the requirements of the regulations in detail. The purpose is to alert you to the existence of the PSSR and give basic guidance on them based on Calor Gas understanding of their application to LPG.

If you require more detailed understanding of the PSSR you should obtain a copy of the regulations, approved codes of practice or guidance prepared by the Health and Safety Executive and published on the internet at www.opsi.gov.uk.

In any case, Calor Gas strongly recommends that you contact your insurance company to ensure that you comply with any specific requirements they may have.

NOTE: This booklet is concerned with Calor Gas LPG installations. However, it should be noted that the PSSR also apply to compressed air, nitrogen and other gases over 0.5 bar gauge pressure, all steam systems and pressurised hot water if over 100°C.

2. What is a Pressure System?

A Calor Gas LPG installation is a "Pressure System" when it is one of the categories a) or b) below and the pressure is more than 0.5 bar gauge (about 7.5 PSI).

- a) A bulk storage vessel (tank) and associated pipe work;
- b) The pipe work (and hoses) to which a cylinder (bottle) is connected (cylinders are not included in the PSSR but fall under Carriage of Dangerous Goods Legislation).

A pressure greater than 0.5 bar will occur wherever the LPG is in the liquid state and, in vapour installations generally up to the 2nd stage regulator, if fitted. These two types of installation, showing the extent of the "Pressure System", are shown in diagram fig 1 to 3 (below). These diagrams are not meant to represent the physical layout of the actual installation nor suggest that all the items shown are present or that other equipment is not present.

The PSSR do not apply to the fuel systems of LPG propelled road vehicles but do apply to their refuelling stations, fixed FLT fuel tanks, vessels in road maintenance vehicles and fixed tanks for vapour use on motor caravans.

The PSSR do not apply to domestic pressure systems owned or operated by a domestic consumer.

Not every installation is the same and if you have any doubts please contact the Calor Technical Helpdesk (0845 602 1143).

Who Owns What?

Because of the number of different types of installations it is not possible to give a definitive statement but the table below gives a typical breakdown of ownership. In case of doubt contact either your local Customer Operations Centre or the Calor Technical Helpdesk (0845 602 1143) for advice.

Calor	Customer
<ul style="list-style-type: none"> • Storage vessel (tank) • Vessel fittings including relief valves • Cylinders • Cathodic protection systems • Pumps (on rental) • Pumps by-pass valve (on rental) • Hose for liquid propane • Liquid meters (on rental) • Vapourisers (on rental) 	<ul style="list-style-type: none"> • Regulators • Under pressure & over pressure shut off devices (UPSO & OPSO) • Vapour manifold pipework up to the 1st stage regulator • Pipe work from outlet of 1st stage regulator • Underground pipe work • Hydrostatic relief valves in pipe work • Pressure gauges • Liquid meters (customer owned) • Vapourisers (customer owned)

If the part of the Calor Gas LPG system installed at your premises which you own does not include items of equipment included in the above table, you will not need to do anything to comply with PSSR. However, you will be still required to have a maintenance and inspection regime for the part of the system that you own.

Examples of Pressure System Boundary

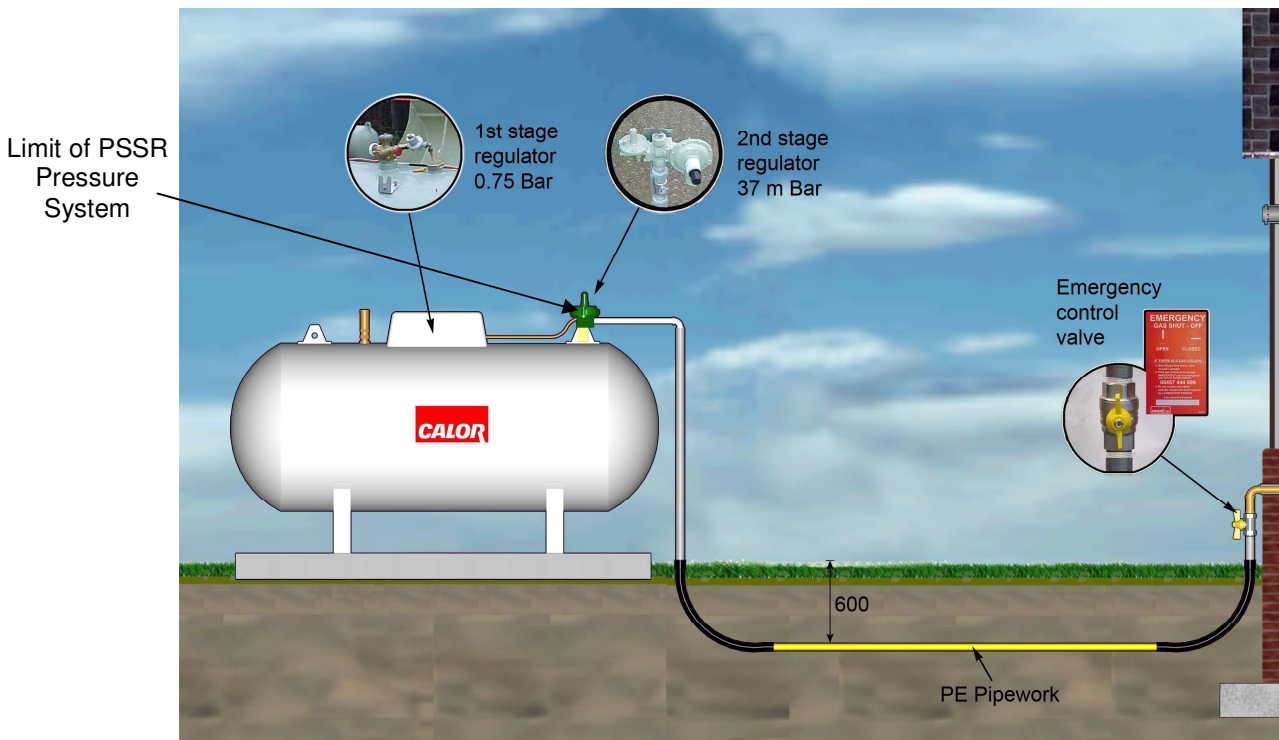


Fig 1. Typical low pressure installation with tank mounted 2nd stage regulator

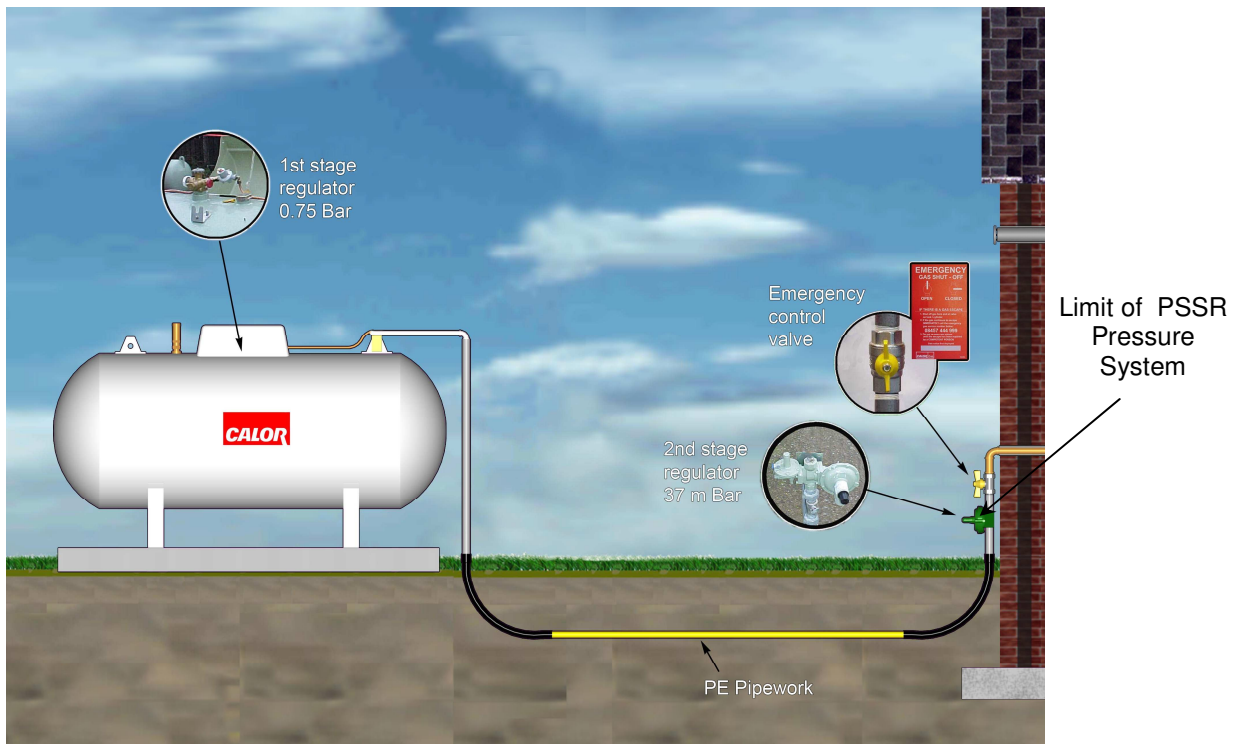


Fig 2. Typical medium pressure installation wall mounted 2nd stage regulator

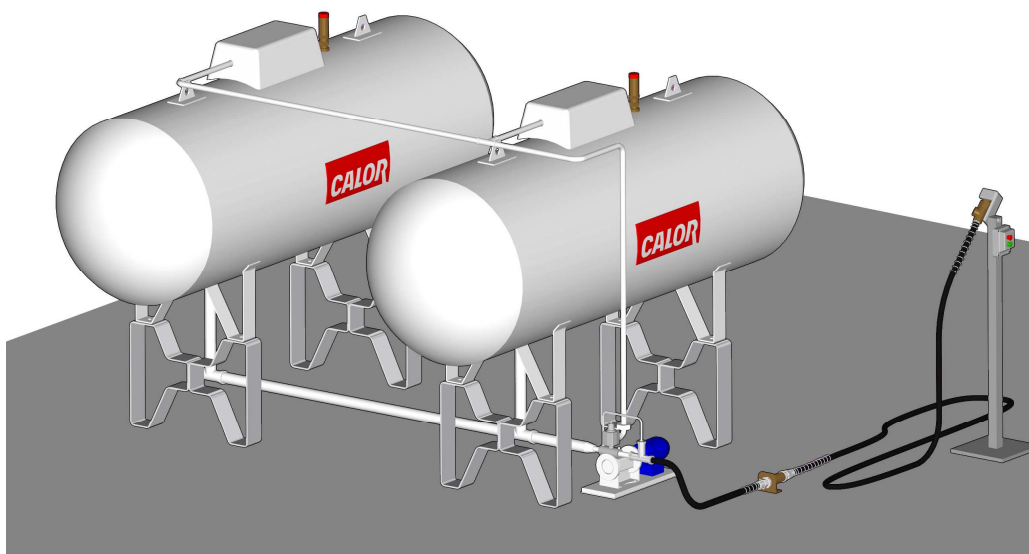


Fig 3. Typical liquid re-fuelling installation, with pump and hose, where the entire installation is a pressure system and subject to the PSSR.

3. What does Calor Gas Do?

The PSSR place various duties on people and companies who design, construct, install and use pressure systems.

For those parts of bulk installation which it owns, Calor Gas carries out **all** duties under the regulations, including those of the **"user"**.

These duties include, but are not limited to, the design, installation, periodic examination, keeping of records, and maintenance of the system and the provision of operating and emergency instructions to you, the **"operator"**.

The terms **"user"** and **"operator"** have specific meanings within the PSSR which are explained in Section 4.

4. What does the customer have to do?

Firstly you should understand which parts of the system you own & operate and which parts Calor owns and operates, with reference to section 2 and the contract you have with Calor.

If you are visited by a HSE or Environmental Health Officer and they ask about your LPG installation, you should advise that Calor Gas is the **"user"** of the parts which it owns and has taken on the **"users"** duties. Any requests for technical information or copies of periodic examination reports should be directed to the Calor Technical Helpdesk (0845 602 1143).

Secondly, for those parts of the system which you own, you must make arrangements to carry out the **"user"** duties. These can be briefly summarised as follows:

- a) Knowing the safe operating limits of the system: that is the pressure that each part of the system can safely withstand and the related temperatures.

The limits for pipe work systems normally installed for LPG are summarised in Appendix A.

For other systems, the system designer or installer should provide this information.

- b) Ensuring the system is operated within safe limits: this may entail ensuring that regulators are correctly adjusted and in good condition, etc.
- c) Having a formal written scheme for the periodic examination of the parts of the system which you own and are within the scope of the PSSR. The scheme (known as the Written Scheme of Examination or WSE) must be written or endorsed by a Competent Person and has to cover:
- Protective devices: that is hydrostatic relief valves, over-pressure shut off devices, regulators having an outlet pressure of over 0.5 bar gauge where the down-stream pipe work cannot withstand the inlet side pressure and pressure gauges.
 - Any pressure vessels, including vaporisers.
 - Any parts of the pipe work, including hoses, in which a release of stored pressure due to sudden mechanical failure would cause danger to a person.

This last point is very important. The PSSR are concerned purely with the potential dangers arising from the **pressure energy** stored in a system, not with the flammability of the product stored. Thus leaks of LPG, which must be guarded against because of risk of fire or explosion, are not covered by the PSSR. It is, however, essential that systems are maintained gas tight irrespective of the PSSR, in order to comply with your duties for maintaining a safe system in accordance with Dangerous Substances and Explosive Atmospheres Regulations (DSEAR).

- d) Ensuring that a Competent Person examines the parts of the system specified in the WSE, at the prescribed intervals.
- e) Ensuring that the system is maintained in a safe condition.
- f) Keeping of copies of the examination reports and information about the safe operating limits, repairs and modification, etc.

Where the only pressure system that you own consists of simple LPG pipe work and associated equipment (similar to those illustrated in figures 1 to 3), a simple WSE is appropriate. An example is included in Section 6 of this booklet. However, to fully comply with the PSSR you would have to get the scheme certified by a competent person as being suitable.

Where your LPG system is more complex and includes vessels, vaporisers or aerosol filling equipment, etc. you will need to have a WSE produced specifically for your system. Established engineering inspection companies can provide this service as well as carrying out examinations in accordance with the WSE.

In no circumstances must any equipment owned by Calor Gas be included in your WSE.

g) Irrespective of whether inspection of pipe work is required by a WSE under PSSR, an inspection and maintenance strategy should be in place to ensure continuity, integrity and soundness of all piping systems. Calor strongly recommend that any underground metallic pipework systems (including metallic risers are replaced with polyethylene pipe). Special attention should be paid to underground pipe work due to risk of undetected corrosion or other types of deterioration. This is particularly relevant at all air/soil/pipe interfaces as these locations are most prone to corrosion.

Finally, you should have, and be familiar with, the operating and emergency instructions provided by Calor Gas and comply with them.

5. Definitions

The PSSR use various terms and expressions with specific meanings, some of which have been used in this booklet.

The following definitions represent the Calor Gas interpretation of these terms as used in this booklet where they have not already been explained in the text:

“Competent Person” – a company, partnership or self-employed person, who has sufficient training and experience to carry out the activity in hand.

In the case of producing or endorsing Written Schemes of Examination this will generally be an organisation which employs at least one chartered engineer with experience in the examination of pressure systems and knowledge relating to LPG.

Examinations under the WSE may be carried out by different, lesser qualified persons or organisations provided they are competent by virtue of having appropriate qualifications, training and experience.

“Operator” - the company or person who operates a system owned by Calor Gas e.g. a customer consuming gas from a vessel owned by Calor.

“Pipe work” - the pipes, hoses, valves and any pumps, compressor, in-line filters, etc. connected to a bulk storage vessel or to which a gas cylinder is connected. It does not include pressure relief valves, hydrostatic relief valves, over pressure shut off devices or any regulators which are classed as protective devices (see Section 4.c).

“User” - the company which controls the operation of the system.

For parts of the system which it owns, Calor is the user by virtue of its ownership, installation, filling with product, inspection and maintenance functions.

For parts of the system owned by you, you are the **“user”**.

“Written Scheme of Examination” - is the formal scheme for the periodic examination of the parts of the system which require it under the regulations referred to in Section 4.c) of this booklet.

6. Example of Written Scheme of Examination for Simple Pipework.

The following example Written Scheme of Examination (WSE) is applicable to simple LPG pipe work systems owned by the customer connected to a bulk LPG storage facility or cylinders owned and operated by Calor Gas Ltd. It is not suitable for systems which include pressure vessels or vaporisers owned by the customer.

The regulations require that the WSE covers:

- All protective devices
- All pressure vessels
- Parts of pipe work which would give rise to danger.

In this case, protective devices are considered to be any device that protects the downstream pipework from exceeding this pipework’s design pressure, such as hydrostatic relief valves (fitted to liquid pipe work), over pressure shut off devices and regulators.

The size and pressure of pipe work underground is such that it is not considered to give rise to danger due to release of stored pressure

energy and hence does not require examination under the WSE. However, above ground pipe work operating above 0.5 bar should be included in the WSE.

The WSE must specify which parts of the system require examination, the nature and frequency of examination, any special preparation for examination and whether examination prior to first use is required and the name of the Competent Person drawing up the scheme.

The example WSE satisfies these requirements.

Note: Regardless of whether a WSE is produced for the pressure system, Regulation 12 of the PSSR still requires the user/owner to ensure the system is properly maintained in good repair, so as to prevent danger.

EXAMPLE COPY

CUST/WSE/01

Written Scheme of Examination for customer owned pipe work and fittings forming part of LPG systems installed at customer premises.

Example Copy

Declaration

This Written Scheme of Examination has been certified by a competent person in compliance with SI 2000 No 128. The Pressure Systems Safety Regulations 2000.

SCOPE

This written Scheme applies to the customer owned liquefied petroleum gas (LPG) pipe work system associated with Calor Gas bulk storage* / cylinder* installation at the following premises.

Name of user:

Address:

.....

.....

FIELD OF APPLICABILITY

This Written Scheme is applicable to the LPG pipe work including, where applicable, hoses*, pipes, valves, pumps*, compressors*, over pressure shut off devices* and regulators* where the pressure is over 0.5 bar gauge (7.5 PSIG)

* delete as applicable.

Example Copy

Examination Requirements

The following parts of the system, if applicable, require examination, under the scheme:

- i. Hydrostatic Relief Valves (HRV)
- ii. Overpressure Shut Off Devices
- iii. Regulators having an outlet pressure over 0.5 bar g where the regulator protects the downstream pipework from exceeding this pipework's design pressure
- iv. Pipework operating above 0.5 bar (Note: HSE current view – not policy- is that underground pipework can be excluded from the WSE)

NOTE

Exclusion of parts of the system from examination under the Scheme does not remove the need for inspection and maintenance to ensure gas tightness and correct operations of appliances, etc.

Prior to the examination specified below, the system shall be made safe by a person or company experienced in working with LPG pipe work installations.

The nature and frequency of examinations shall be as follows:

1. Hydrostatic Relief Valves (HRV).

The competent person shall carry out a visual examination to check that the HRV's fitted to the pipe work have:

- a) Been replaced by new items
- b) The correct set pressure (24 bar g / 350 PSIG) stamped on the body.
- c) A test date not more than 2 years prior to the examination date.
- d) Rain caps fitted.

The examination shall take place prior to first use of the system and at intervals not exceeding 10 years thereafter.

2. Regulators & OPSO Devices (when required).

The competent person shall carry out a visual examination to check that regulators requiring examination under the Scheme have:

- a) Been replaced by new or reconditioned items.
- b) The regulator is of the correct type and outlet pressure setting.

This examination shall take place prior to first use of the system and at intervals not exceeding 10 years thereafter.

Example Copy

Review

This Written Scheme should be reviewed by a competent person at intervals not exceeding 5 years and modified if necessary.

Written Scheme of Examination certified by:
(Name & Address of Competent Person)

Signed: Date

Date of Issue to Customer

Review Date:	Signed:	Name:
.....
.....
.....
.....

7. Source of Further Information.

The following lists give some examples of further information which may help you understand and comply with the PSSR.

Copies of the Regulations are available from The Stationary Office bookshops or some from the HSE website as a free download.

2000: No 128 The Pressure Systems Safety Regulations 2000.
ISBN 0-11-085836-0 (As amended by Carriage Regulation 2004)

Safety of Pressure Systems, Pressure Systems Safety Regulations 2000, Approved Code of Practice (L122)

The following publications are available from HSE Books, PO Box 1999, Sudbury, Suffolk. Tel: 01787 881165.

Pressure Systems and Transportable Gas Container Regulations 1989 – An Open Learning Course ISBN 0-7176-0687-2.

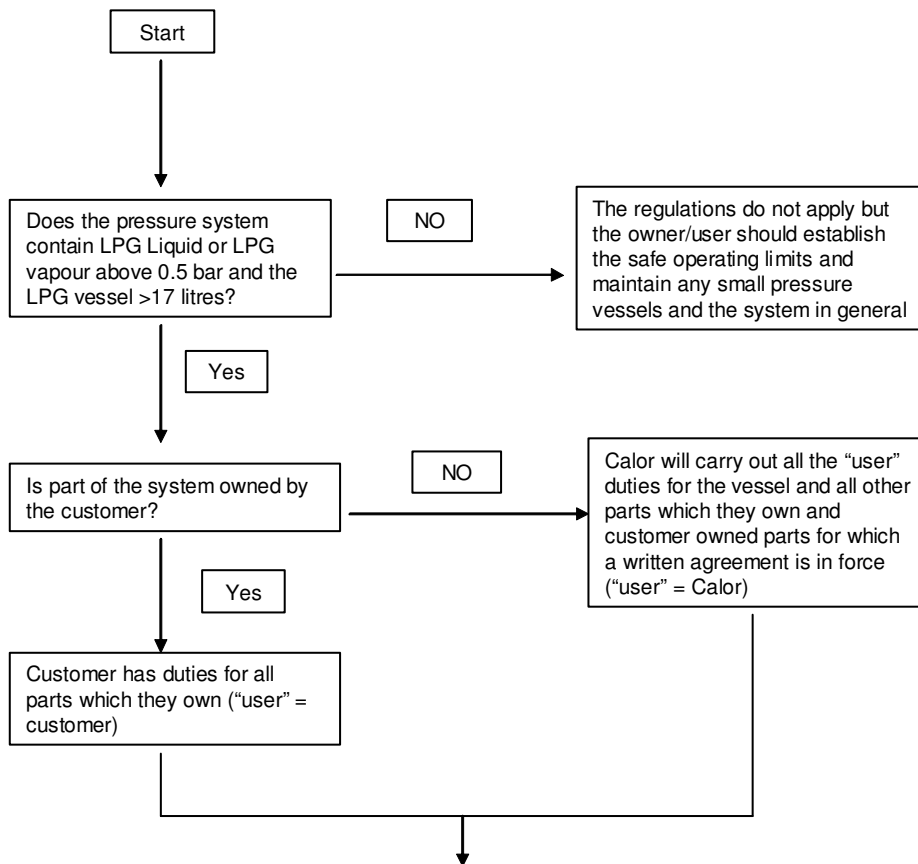
Written Scheme of Examination IND(G) 178L C200

APPENDIX A

SUMMARY OF SAFE OPERATING LIMITS FOR LPG PIPEWORK

PIPEWORK TYPE	TYPICAL SERVICES	SAFE OPERATING LIMITS
Seamless Steel (BS: 3601 S320 ASTM A 106 Gr B)	Liquid or vapour at Vessel pressure	24 bar g (350 PSIG) + 50 °C to - 20
Welded steel (galvanised) (BS EN10255 or BS:1387 heavy or medium)	Vapour after 1 st regulator	4,82 bar g (70 PSIG) + 50 °C to - 20 °C
Copper over 12mm diameter and less (BS:2871 pt2, Table X)	Vapour at vessel pressure or after 1 st regulator	19,79 bar g (287 PSIG) + 65 °C to - 20 °C
Copper over 12mm diameter (BS: 2871 Pt 2, Table X or Y)	Vapour after 1 st regulator	4,82 bar (70 PSIG) + 40 °C to - 20 °C
Polyethylene (SDR 11) (British Gas Spec. BGC/PS/PL2, Pt 2.)	Underground vapour after 1 st regulator	4 bar g (58 PSIG) + 45 °C to - 20 °C [100 bar g burst]
Hose (liquid) (CAL 101)	FLT cylinder filling / cylinder liquid offtake.	25 bar g (362 PSIG) + 45 °C to - 20 °C [100 bar g burst]
Hose (vapour) (BS:3212, Type 2)	Vapour offtake from cylinders (2 or 4 x 47 change-over)	20 bar g (254 PSIG) + 60 °C to - 20 °C [52 bar g burst]

APPENDIX B



All Regulations apply. In particular note

REG.7 - Establish safe operating limits i.e pressure and temperature. Your Calor region can offer advise (All new systems should comply with LPGA Code of Practice 22, see also Appendix A)

REG 8. - Have a written scheme of examination (WSE) prepared and certified by a suitable competent person.

REG 9. - Have a examination carried out by a competent person at the prescribed intervals in accordance with the written scheme. Your Calor region can arrange to provide names of appropriate companies.

REG 11 - Provide suitable instruction to ensure the safe operation of the system.

REG 12 - Ensure that the system is properly maintained . Your Calor region can advise you on appropriate maintenance and provide names or appropriate companies

REG. 14 - Set up and keep adequate records examinations and instructions

Appendix C Customer Operations Centre

Site	Contact number
Grangemouth	01324 486231
Port Clarence	01642 546163
Elland	01422 376711
Neath	01639 645252
Stoney Stanton	01455 272937
Coryton	01375 645763
Plymouth	01752 896575
Fawley	02380 243754

All general enquiries contact

Calor Gas Limited
Calor Customer Support Centre
Athena Drive
Tachbrook Park
Warwick CV34 6RL

Tel: 01926 330088

CALOR GAS EMERGENCY SERVICE
0845 7 444999

(ALL CALLS CHARGED AT LOCAL RATE).