





Pars Oil & Gas Company

Pressure Testing Safety Procedure

HEALTH, SAFETY AND ENVIRONMENT PROCEDURE

Pressure Testing Safety Procedure

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SUGGESTION FORM

1. INTRODUCTION

Pars Oil and Gas Company (POGC), a subsidiary of National Iranian Oil Company (NIOC), was established in 1998. POGC is a developmental and manufacturing organization that specializes in the fields of engineering and management of development projects, production, operation and integrated management of oil and gas reservoirs. POGC's mission is to ensure sustainable and preservative production and development of Iran's oil and gas industry in the areas under its responsibility, development of oil and gas value chain as well as optimization of energy supply processes at national, regional and international levels. POGC is also in charge of development of joint and non-joint oil and gas fields of the country including South Pars, North Pars, Golshan and Ferdowsi.

Aimed at creating superior value and boosting the level of satisfaction of the beneficiaries and with an approach focusing on sustainable, integrated and knowledge-oriented production and development, the company feels committed to comply with national and international requirements, regulations and standards in such areas as quality, safety, as well as occupational and environmental health.

2. PURPOSE

Aimed at creating superior value and boosting the level of satisfaction of the beneficiaries and with an approach focusing on sustainable, integrated and knowledge-oriented production and development, the company feels committed to comply with national and international requirements, regulations and standards in such areas as quality, safety, as well as occupational and environmental health.

Pressure testing is carried out to check that a pressure vessel or piping can be safely operated at operate at the design pressure.

Pressure testing and pressure leak testing are potentially hazardous operations and it is essential to observe the appropriate precautions in carrying them out.

The equipment to be tested should always be given as thorough a visual inspection as practicable before any test is carried out. In such cases it is a general requirement that the pressure test must be carried out in the presence of the appropriate designated inspector. This Specification describes POGC's requirements to ensure the safety and protection of personnel, plant and equipment during pressure testing and leak testing.

3. SCOPE

This Specification applies to all leak testing and pressure testing operations by POGC, Contractors or Sub-Contractors authorised to work on behalf of POGC.

4. RESPONSIBILITIES

4.1 Site Manager

Site Manager is responsible for ensuring that this procedure is correctly followed. It is the responsibility of the Site Manager to designate responsible persons as inspection Authority on any Project operating site.



Also Site Manager shall ensure that any pressure testing is carried out following a specific procedure agreed by all concerned parties (performer, person in charge of the installation, safety Authority and inspection Authority).

Any pneumatic pressure testing should be formally authorized by the Site Manager (signature or work permit form).

4.2 HSE Manager

The designated person is responsible for defining testing methods, authorizing dispensations to omit pressure testing, validating pressure testing procedures and sanctioning any pneumatic pressure tests.

Ensuring that the term and conditions stated on the pressure testing procedure are adhered to at all time.

For pneumatic pressure testing, the safety authority should lead hazard identification and risk assessment study with concerned parties.

He is responsible to monitor the safety of all working practices relevant to pressure testing and leak testing; ensuring that barriers and warning signs are correctly positioned at work sites where pressure testing and leak testing are being carried out.

4.3 Inspection Authority

The designated person as inspection Authority is responsible for defining testing methods, authorizing dispensations to omit pressure testing, validating pressure testing procedures and sanctioning any pneumatic pressure tests.

HSE officer is responsible for monitoring the safety of all working practices to ensuring that barriers, fire fighting equipment and warning signs are correctly positioned at work sites and no other works will be carried out in the pressure testing area.

4.4 Person in charge of the installation

The person in charge of the installation in addition to his specific duties and responsibilities under the work permit system should insure that all employees are informed of any pressure testing operations that will be carried out in their area and that no work will be carried out in the rope on zone up to the completion of the pressure tests.

Pressure operator must be familiar with functions and the purpose of instructions. He must provide to take care of failure and must know how to test all controls. He must ensure the vessel is not higher than the highest pressure that can be expected by the system design.

4.5 Safety Supervisor / Safety Engineer

Safety supervisor/safety engineer with conjunction of field operator must consider all safety precautions at work site before and while performing pressure testing.

Ensuring that barriers and warning signs are correctly positioned at work sites where pressure testing and leak testing are being carried out.

5. PROCEDURE



5.1 General

A new fabricated vessel is tested to a pressure higher than its normal operating pressure and the pressure at which it will be subsequently tested. This test is carried out at the last stage of manufacture and is an indication that the vessel has been designed and constructed to the required standard.

The test fluid should normally be water, but other liquids may be utilized instead if necessary. If another liquid is used, any appropriate precautions should be observed. The ICI (Imperial Chemical Industries) Code states that the liquid should be well below its boiling point and, if flammable, should have a flash point above 45°C.

If water is used with austenitic stainless steel, it is essential to control the chloride and alkali content. Steel piping and pressure vessels, where it is possible to drain out the water and dry out the equipment, should be hydrotested with a solution made up of potable water or steam condensate.

If potable water is not available or if immediate draining and drying is not possible, water having a very low chloride level, higher pH, and an inhibitor addition may be considered to reduce the risk of pitting and microbiologically induced corrosion.

But in case of superheater, it may not be possible to drain the water and due to evaporation, chloride concentration may increase much more than the original concentration. Therefore for the long life reliability, it would be much preferable to use demineralized water up to 30 ppm for testing of boiler if the superheater tube metallurgy is austenitic stainless steel.

Free chlorine levels at entry to the system should be limited to 2-5 ppm. The 2 ppm limit for residual free chlorine is also applicable to any copper alloys in the system. Short term levels of free chlorine of up to 25 ppm can be tolerated.

The test is normally carried out at about ambient temperature. The hazard of brittle fracture should be considered and, if necessary, the test temperature should be chosen so that it exceeds the ductile/brittle transition temperature. Also a temperature in excess of 7°C is recommended in order to avoid the risk of freezing.

There are various precautions which should be taken before a hydraulic test. Checks should be made on the effects of static head, on the ability of the vessel and the structure to withstand the weight of liquid, and on the strength of any temporary pipes, connections or blanks.

The vessel should have suitable vents so that air can be completely removed. Pockets of air left in the vessel constitute a pneumatic explosion hazard.

All filling lines and other equipment which are not intended to be subject to the test pressure should be disconnected before that pressure is applied.

The pressure applied also causes the vessel to assume its final shape. Danger of brittle fracture is greatest during this test and precautions are taken to minimize this hazard.

A vessel which has been in use and is subsequently modified or repaired by welding, or by any other means which may significantly affect its strength, can be subjected to a proof or pressure test, with appropriate precautions being taken against brittle fracture. During pressure testing all fittings should be protected with a "shield" to ensure they do not act like a missile in case of a failure.



It is a normal requirement that certain types of vessel, particularly gas cylinders, can be subjected to a routine pressure test at prescribed intervals.

The initial and regular test pressures can be recorded in the register of the vessel or equipment.

Tests, after repair or modification, can be carried out at this recorded routine test pressure. If not, the registration details of the vessel can be altered to signify de-rating of the vessel to a lower operating pressure and a consequently lower test pressure.

5.2 Test Medium

Pressure Testing may be carried out either:

- Hydraulically, using liquid (usually water) as the test medium.
- Pneumatically, using inert gas (usually air) as the test medium.

At the test pressure ranges most frequently used (and is normally limited to a maximum of 10 bar G for gas/air) the amount of energy contained using gas more than 200 times the energy contained in liquid at the same pressure and volume.

For this reason, hydraulic pressure testing is the preferred method and should be used whenever practicable.

CAUTION: Pressure testing using gas should only be carried out in circumstances where hydraulic testing is proven to be impracticable.

CAUTION: pressure testing with flammable gasses or toxic liquid is prohibited unless properly process conducted. But it is important to avoid initiating corrosion Damage and contamination must be avoided.

All pressure testing must be conducted under the conditions of the Permit to Work System and specific procedures must be produced and followed.

There must always be two independent means of identifying the test pressure; one certified gauge and one certified clock recorder. A faulty gauge could lead to either a sub-standard test or an over –stressed situation. The test must be recorded.

Barriers must be erected and warning signs posted in the test area. The area where the testing is conducting shall be posted with signs indicating "DANGER - HIGH PRESSURE TEST IN PROGRESS - KEEP OUT" or similar warnings. Caution: pressure testing at dark weather is prohibited

Ideally, leaks should never be repaired with the system under pressure. Should this be impracticable, great care must be taken to ensure that bolts, fittings and connections are not overstressed while trying to rectify a leak and the system pressure should be reduced to the minimum practicable pressure. This work must only be carried out subject to authorization by the responsible area authority.

5.3 Test method

Pressure tests can be divided into two types:



- **Pressure Testing:** These are tests carried out at pressures exceeding the normal working pressure (usually 1.5 times for Hydraulic and 1.1 times for Pneumatic) with the object of providing the mechanical strength and integrity of the vessel or system.
- **Leak Tests:** These tests are normally carried out at or around the normal working pressure and are intended to detect leaks at such places as riveted or bolted joints, flanges, etc.

5.4 Hydraulic Pressure Testing

The joint rings and gaskets used for the test must be of the same material and dimensions as those used in normal operations, as those used in normal operations, unless otherwise specified.

The test pressure must be applied gradually to avoid shock and any danger of exceeding the specified test pressure. It is recommended that the application of the test pressure be in at least four stages, with the operation held at each stage to check for leaks. Vessels must be roped off to prevent personnel entering closer than 10 m while it is under pressure.

Strain measurements are not required during routine tests unless it is specified in the registration details e.g. for certain types of transportable gas containers.

When testing vessels made of austenitic steel, the water used for testing must not have a chloride or alkali content higher than any aqueous process fluid used in the vessel.

The vessel being tested must be properly vented to exclude any possibility of air pockets. Steps must be taken to ensure that blanking-off devices and such items as screwed plugs or connections are not liable to be ejected during testing, e.g. as the result of thread failure. These items must be up to at least the specification of the vessel and/or associated pipe work and fittings.

A vessel must not be subjected to any form of shock loading such as hammer-testing whilst undergoing a full over-pressure test.

A vessel subjected to maximum test pressure must not be approached for close examination until after a reasonable period of time (at least one hour) has elapsed.

Special consideration must be given to safety of personnel in the case of vessels subject to High pressure where the contained energy is high. As a rough guide, pressures in excess of 70 bar G are considered high pressure.

Special consideration could be indicated as follows:

- Perform an equipment safety inspection prior to each operation to ensure all connections are tight and hoses are not deteriorated or damaged.
- Work areas for testing can be restricted to personnel by secure barriers and warning notices can be posted to warn personnel.
- Only those persons essential to the task are allowed within the restricted area.
- The test person's essential could use personal protective equipment.
- Do not use a hand to check for high pressure fluid leaks.



Care must be taken not to overstress the vessel during testing. In the absence of any appropriate standard or code, the test pressure must be limited to the pressure equivalent of 90% of the yield strength (proof strength) of the material.

Where a pressuring medium other than water is used (By permission of commissioning Manager), care must be taken to recognize any additional hazard associated with the liquid concerned. A leak of highly flammable liquid for example, could lead to a serious fire.

It may also be necessary to consider the purity of the testing. Medium particularly where complete drainage of the vessel after test may not be possible.

Test medium could be discharged in a controlled manner and into suitable open drain area. Measures should be taken to prevent overpressure of the vessel during test. Two independent (and preferably if different nature) accurate and reliable means of measuring the pressure should be provided. Use of certified gauges and certified "clock" is recommended.

Gauge selection must be according to test pressure required by process conditions. Pressure gauges must be located at suitable side as so easily read by operator and must be protected against vibration.

The possibility of overpressure due to liquid temperature rise and expansion should be considered and, if necessary, a liquid relief valve should be provided .

Additional design pressure is to be determined, and where the strength cannot be satisfactorily calculated, for example, after fabrication work has been carried out on pipe work, a hydraulic proof test will be necessary. The following precautions are in addition to those recommended for hydraulic pressure testing :

- Proof hydraulic testing must be carried out under the direct supervision of a person complement to carry out such a test.
- The pressure must be applied gradually and increased by steps of approximately 10% until the required test pressure is reached, or until significant yielding occurs. At this stage the pressure must not be further increased. The onset of yielding must be determined by the use of strain gauges.

Advantages of hydraulics

Liquid (as a gas is also a 'fluid') does not absorb any of the supplied energy.

Hydraulic is capable of moving much higher loads and providing much higher forces due to the incompressibility.

The hydraulic working fluid is basically incompressible, leading to a minimum of spring action. When hydraulic fluid flow is stopped, the slightest motion of the load releases the pressure on the load; there is no need to "bleed off" pressurized air to release the pressure on the load.

5.5 Pneumatic Pressure Testing

Pneumatic pressure testing must only be used if hydrostatic testing is impractical and is normally limited to a maximum of 10 bar G.



Pneumatic pressure testing can be a very hazardous operation due to the danger of explosive rupture if any mechanical failure occurs. It is therefore only to be carried out with the full agreement of the relevant line management.

All personnel concerned with pneumatic testing must be competent and familiar with the hazards associated with any gas used, e.g. the danger of asphyxiation in vessels not properly ventilated.

Pneumatic testing of vessels constructed of material liable to brittle fracture under test conditions must be avoided.

Before testing, careful inspection of the vessel must be carried out. In the case of pressure vessels, the inspection must include radiographic or other non-destructive testing of welds.

Where practicable, steps should be taken to reduce to a minimum the internal volume of the vessel to be tested. This has the effect of reducing the energy stored in the vessel whilst it is under pressure, hence reducing the consequences of vessel failure. This can often be achieved by placing metal or hardwood cores inside the vessel.

Where the source of pressure is higher than the test pressure, precautions against over-pressurisation of the vessel should be taken by the use of reducing valves, pressure gauges and safety valves of adequate size.

Steps must be taken to ensure that personnel are not likely to be injured in the event of an explosion. This can be achieved by ensuring that the site is cleared and personnel are adequately protected. Any enclosures must be capable of containing flying materials in the event of vessel failure and of withstanding the rise in pressure caused by release of air, steam or inert gas.

As a guide for a test pressure <20 bar G, no personnel are allowed within 15m of the test area. This area must be enclosed by barrier and signs posted.

For pressures > 20 bar G, no personnel are allowed within 25m of the test area. Again, the area must be enclosed by barrier and signs posted.

Pressure must be increased slowly and frequent stops made to inspect for leaks. For pressure >20 bar G. The pressure must be reduced by 5% before the inspections commence.

The vessel under test must not be subjected to any form of shock loading such as hammer testing. The vessel must not be approached for close inspection until after the test pressure has been reduced.

In addition to applicable safety practices, the following points have to be considered for gas testing (see BS 5500 for reference).

Gases used in pneumatic systems

Pneumatic systems in fixed installations such as factories use compressed air because a sustainable supply can be made by compressing atmospheric air. The air usually has moisture removed and a small quantity of oil added at the compressor, to avoid corrosion of mechanical components and to lubricate them.

Pneumatic-power users need not worry about poisonous leakages as the gas is commonly just air. Smaller or stand-alone systems can use other compressed gases which are an



asphyxiation hazard, such as nitrogen - often referred to as OFN (oxygen-free nitrogen), when supplied in cylinders.

Any compressed gas other than air is an asphyxiation hazard - including nitrogen, which makes up approximately 80% of air. Compressed oxygen (approx. 20% of air) would not asphyxiate, but it would be an extreme fire hazard, so is never used in pneumatically powered devices.

Portable pneumatic tools and small vehicles such as Robot Wars machines and other hobbyist applications are often powered by compressed carbon dioxide because containers designed to hold it such as soda stream canisters and fire extinguishers are readily available, and the phase change between liquid and gas makes it possible to obtain a larger volume of compressed gas from a lighter container than compressed air would allow. Carbon dioxide can cause asphyxiation and can also be a freezing hazard when vented inappropriately.

Both pneumatics and hydraulics are applications of fluid power. Pneumatics uses an easily compressible gas such as air or a suitable pure gas, while hydraulics uses relatively incompressible liquid media such as water or oil.

5.6 Leak Testing

Leak testing using air, steam or inert gas as the test medium may be safely carried out providing the vessel has been subjected to a recent over-pressure hydraulic test at a greater pressure. It is sometimes desirable to carry out a gas leak test before the hydraulic test. A test for this purpose may be applied to a pressure vessel without observing the requirements applying to pneumatic acceptance tests, providing the test pressure does not exceed 10% of the design pressure.

Leak testing is sometimes applied to vessels not design, or intended to be used as pressure vessels, for example, fuel tanks, radiators, storage tanks and oil drums. Danger may arise because the strength of the vessel has not been proven and may not be known.

In a pneumatic test, leak testing must be carried out with the use of soapy water. Under no circumstances must a naked flame be used. Soapy water testing involves wrapping a flange with tape and then pricking a small hole in it and applying a soapy solution. The person carrying out the leak test shall be accompanied at all times by a second person able to render assistance if required.

Leak Testing: Special Conditions

Leak test pressure must always be kept as low as possible. In the case of tanks or radiators intended to contain liquids, there is nothing to be gained by testing them at a pressure more than a few psig unless they are going to be subjected in service to liquid head or pressure greater than this. Means must be provided to ensure that the intended test pressure is not exceeded. If the source of gas is at a higher pressure than the test pressure, a reducing valve must be fitted together with a safety valve and a pressure gauge on the low pressure side.

For low pressures of 2 – 5 psig (up to 1/3 bar g), a lute of adequate area is preferable to a safety valve. (A lute is a device, such as a U-tube, that uses a water leg of appropriate



height to maintain the air pressure; over-pressure will blow the water out and release the pressure).

All articles or vessels must be carefully inspected before being subjected to pneumatic test pressure. In the case of low pressure leak testing the inspection must be visual and, if necessary, may include radiographic or other non-destructive tests.

Steps must be taken to ensure that any openings in the components under test are adequately sealed and that closures will not fail under pressure. Bolted flanges or screwed caps must be used wherever possible. The interior volume of the components under test must be reduced wherever practicable.

Work areas for leak must be restricted to personnel by secure barriers and warning notice must be posted to warn personnel. Only those persons essential to the task are allowed within the restricted area.

If the work is in a confined or restricted space, oxygen monitors and escape sets must be provided and used.

5.7 Flexible Tube Connections

During low pressure testing, rubber tubing is sometimes used for connecting the air supply to the article under test. Pushing the rubber tubing onto a pipe or spigot on the test component without positive clamping is not acceptable as a means of preventing overpressure. Accidents have been caused by tubes becoming detached under pressure. Before starting the presser test, the tubes and clamps must be checked and approved by Safety supervisor or field operator.

Prior to testing, each section of hose shall be subjected to a physical inspection to determine whether it is free of debris, and damage from chemicals, burns, cuts, and abrasion. Any section of hose that fails the physical inspection shall immediately be placed out of service. Hose that fails the test by bursting or leaking or because of coupling failure due to slippage or leakage shall be placed out of service. Operator is responsible for accepting the thickness, length and working pressure.

5.8 Safety and Relief Valves

To ensure correct operation, safety valves and relief valves must be checked as follows:

- Ensure that the correct valves set at the correct pressure, is fitted to the equipment.
- Ensure that all valve orifices are clean and not blocked with debris or paint.
- lubricate valve only with lubricants recommended by the manufacturer.
- Ensure valve threads and sockets are clean and free from grit, dirt, oil, or dirty water before fitting to equipment, to prevent leaks from the joints.
- Always open safety valves slowly.
- Adjust valves only by comparison with a calibrated valve. Under no circumstances must valve be tampered with.
- Periodically service and test all safety relief valves. The periodicity is detailed in the manufactures' maintenance manual.



- Suitable calibration tags, dated and initiated, must be fixed to all gauges and valves as required.
- Don't use white or red lead or any other joining compound when fitting valve is required.

5.9 Work permit system

All pressure testing must be conducted following a specific procedure and under the conditions of the Permit to Work system. The conditions of such Permits to Work must be strictly observed and procedure strictly adhered to.

For any gas testing a risk evaluation study should be carried out to support specific Permit to work requirement (extent of the area to be roped on). See Standard BS 5500 for details. Notification must be given prior to pressure testing. Barriers must be erected and warning signs posted in the test area.

6. Definition

A hydrostatic test

is a way in which leaks can be found in pressure vessels such as pipelines. The test involves placing water, which is often dyed for visibility, in the pipe or vessel at the required pressure to ensure that it will not leak or be damaged.

Hydrostatic testing is also a way in which a gas pressure vessel, such as a gas cylinder or a boiler, is checked for leaks or flaws. Testing is very important because such containers can explode if they fail when containing compressed gas.

Compressed air

is air whose volume has been decreased by the application of pressure. Air is compressed by various devices, including the simple hand pump and the reciprocating, rotary, centrifugal, and axial-flow compressors. As a source of power it is used to operate pneumatic tools, e.g., pneumatic hammers and drills and spraying equipment. It is widely employed for cleaning dust and dirt out of mechanical equipment. It is used also in gas plants, mining, tunnelling, and the manufacture of explosives, since it is not a fire hazard. Compressed air is in readily available supply and is easily stored and transported.

Design Pressure

is Maximum Operating Pressure, The pressure used in the calculation or design characteristics of a pressure vessel for specific parts of the structure.

Pneumatic test pressure

is design pressure multiply by 1.1

Hydro-test Pressure

is design pressure multiply by 1.5

Pneumatics is a branch of technology, which deals with the study and application of use of pressurized gas to affect mechanical motion.

Pneumatic systems are extensively used in industry, where factories are commonly plumbed , piping system of gas plants is completed and will be performed by compressed



air or other compressed inert gases. This is because a centrally-located and electrically-powered compressor that powers cylinders and other pneumatic devices through solenoid valves is often able to provide motive power in a cheaper, safer, more flexible, and more reliable way than a large number of electric motors and actuators.

Designated Inspector

A designated person is responsible for defining testing methods, authorizing dispensations to omit pressure testing, validating pressure testing procedures and sanctioning any pneumatic pressure tests.

Test Medium

A substance such as water or gas is used where pressure is transmitted for testing.

Pressure Testing

These are tests carried out at pressures exceeding the normal working pressure with the object of proving the mechanical strength and integrity of the vessel or system.

Leak Tests

These tests are normally carried out at or around the normal working pressure and are intended to detect leaks at such places as riveted or bolted joints, flanges, etc.

Pressure gauges

Instruments used to measure pressure are called pressure gauges.

Safety valve

A safety valve is a valve mechanism for the automatic release of a gas from a system when the pressure exceeds preset limits.

Imperial Chemical Industries (ICI)

(ICI) is a British chemical subsidiary of a Dutch conglomerate and one of the largest chemical producers in the world. It produces paints and speciality products (including ingredients for foods, specialty polymers, electronic materials, fragrances and flavours).

7. References

- British standard 5500
- National Iranian Oil Company safety regulations
Part- 1: Safety responsibilities and control.
Part- 13: Contractors responsibility about safety.



8. APPENDIX

APPENDIX 1 : BELOW ARE SOME ITEMS WHICH SHOULD BE CHECKED WHEN PRESSURE TESTING

APPENDIX 2 : *Inspection Checklist Pressure Safety*



APPENDIX 1 : BELOW ARE SOME ITEMS WHICH SHOULD BE CHECKED WHEN PRESSURE TESTING

No.	Description	Yes	No	N/A	Comments
1	Has the correct test pressure been identified?				
2	Is the design/working pressure of the vessel clearly known to all?				
3	If the test is pneumatic, was it impracticable to perform a hydraulic test? If so why?				
4	Is a competent person in charge of pressure testing?				
5	Has the correct Permit to Work been raised?				
6	Are there two independent methods of identifying the test pressure?				
7	Is the test pressure being applied gradually in 10% increments?				
8	Is proper leak detection being performed i.e. visually, soap test?				
9	Is the test pressure being held at the correct pressure for one hour?				
10	What are the acceptance criteria for leaks e.g. usually less than 1% loss in pressure over 1 hour?				
11	Have barriers and signs been installed at the correct location? For pneumatic testing this is 15m (for pressure<20 bar) and at 25m (pressure>20 bar).				
12	Are all fittings protected with a shield to prevent injury to personnel in case of failure?				
13	For pneumatic tests has the pressure been reduced slightly (by 5%) before inspecting for leaks?				
14	Are appropriate safety / relief valves in position, calibrated and operational?				



APPENDIX 2 : Inspection Checklist Pressure Safety

INSPECTION CHECKLIST PRESSURE SAFETY

Inspection No. :

Facility:

Date Completed:

Activity 1 - Walk down a pressure vessel and connected piping

	<u>YES</u>	<u>NO</u>	<u>N/A</u>
1. Does the pressure vessel have a tag or nameplate attached or connected to it showing the following information:			
a. Component identification number?
b. Maximum allowable working pressure?
c. Fluid?
d. Temperature (expressed as a range)?
e. Date tested?
f. Expiration date?
g. Inspected by?
h. Date?
2. Is the vessel and associated piping free of any sign of strain, deformation, distention, swelling, damage, or corrosion?
3. Is the vessel equipped with a pressure relief device to prevent over-pressure?
4. Is the relief device set at the required pressure?
5. Is the discharge from the pressure relief device free of any valves until the discharge reaches a blow down tank or atmosphere?
6. Is the relief device pointed away from areas where personnel may be located if it is not piped to a vent?
7. Does the as-installed condition of the pressure vessel and attached piping match the design documents?
8. Are all fittings and vessel seals tight?



INSPECTION CHECKLIST PRESSURE SAFETY

	YES	NO	N/A
9. Is adequate instrumentation provided to monitor process conditions in the pressure vessel as appropriate, including pressure, temperature and level?
10. Is documentation available to substantiate that the pressure vessel has been adequately pressure-tested within the last five years?
Activity 2 - Observe a Pressure Test			
11. Are tests performed in accordance with formal procedures that have been subjected to a thorough independent review?
12. Was the procedure reviewed by the designer and the safety organization before approval?
13. Is the equipment and piping to be tested shielded or barricaded to minimize the potential for injury to personnel if the vessel or piping fails during testing?
14. Are all extraneous personnel evacuated from the area before testing commences?
15. Is the area where the testing will be conducted posted with signs indicating "DANGER - HIGH PRESSURE TEST IN PROGRESS - KEEP OUT" or similar warning?
16. Are all prerequisites for testing completed before testing commences?
17. Do test personnel use means for performing leak testing other than open flames?
18. Are vessels and piping always depressurized before any efforts to repair leaks are initiated?
19. At the conclusion of the test, are measurements taken to confirm that the vessel has not plastically deformed?



INSPECTION CHECKLIST PRESSURE SAFETY

- | | YES | NO | N/A |
|---|-------|-------|-------|
| 20. Are data sheets signed by appropriate personnel? | | | |
| 21. Do training records substantiate that personnel conducting the test have received appropriate pressure-safety training? | | | |

Activity 3 - Review of Work Package

- | | | | |
|--|-------|-------|-------|
| 22. Does the work package require depressurization of the component or portion of the system before work begins? | ..... | ..... | ..... |
| 23. Does the work package specify appropriate materials to be used in performing the work? | ..... | ..... | ..... |
| 24. Does the work package specify appropriate welding processes to be used for the work? | ..... | ..... | ..... |
| 25. Are appropriate non-destructive examinations specified in the work package for welds or repair work? | ..... | ..... | ..... |
| 26. Are quality assurance hold points or quality control inspection points specified in the work package? | ..... | ..... | ..... |
| 27. Are post-maintenance or repair pressure tests to verify system integrity specified in the work package? | ..... | ..... | ..... |

Activity 4 - Walk down of Compressed Gas Cylinder Installation

- | | | | |
|--|-------|-------|-------|
| 28. Are cylinders stored in racks and with appropriate restraints? | ..... | ..... | ..... |
| 29. Are oxidizers and flammable gases stored separated from each other? | ..... | ..... | ..... |
| 30. Are compressed gas cylinders located well away from sources of heat and stored out of the sun? | ..... | ..... | ..... |
| 31. Are cylinders appropriately labeled to identify contents, maximum allowable working pressure, and date of last inspection or test? | ..... | ..... | ..... |



**SUGGESTIONS FOR THE *POGC*
PRESSURE TESTING SAFETY PROCEDURE**

**MANAGER, HSE Department
I.R. IranPars Oil & Gas Company
Tehran I.R. Iran**

Please consider the following suggestion(s) relative to the *POGC* Pressure testing safety procedure:

(Signature)

(Date)

(Address)

Contact Telephone Number

Contact FAX Number