ABU DHABI OIL REFINING COMPANY (TAKREER)

RUWAIS REFINERY EXPANSION (RRE) PROJECT

PROJECT NO. 5578 / AGREEMENT NO. 09-5578-E-4

EPC PACKAGE - 4 : TANKAGE AND ASSOCIATED INTERCONNECTING PIPING

DOCUMENT / DRAWING COMMENTS SHEET

COMMENTS TO BE RETURNED TO:
COMPANY/PMC

FAX NO.:

BY DATE:

FAX NO.:

BY DATE:

Contractor Transmittal No.	**T-DH-5578-E4-1587**	**Recd. Date**	**29 Oct 2010**
Document No.	**5578-E4-HSE-HU-00033**	**Rev. Date**	**27 Oct 2010**
Document Title	**Welding and Cutting Work Procedure**	**Rev**	**0**

COMMENTS:

By: **Signed** **Date**

Review Code:

1. REJECTED : REVISE AND SUBMIT ☐
2. COMMENTS AS NOTED : WORK MAY PROCEED SUBJECT TO COMPLIANCE WITH AND INCORPORATION OF COMMENTS ☐
3. NO COMMENTS : WORK MAY PROCEED ☐
4. INFORMATION ONLY. : ACCEPTED FOR INFORMATION ONLY ☐

No. of Pages attached to this form :

WELDING AND CUTTING WORK PROCEDURE

AGREEMENT NO.	**:**	**09-5578-E-4**
PROJECT NAME	**:**	**Ruwais Refinery Expansion Project EPC-4: Tankage & Associated Interconnecting Piping**
COMPANY	**:**	**Abu Dhabi Oil Refining Company (TAKREER)**
PMC	**:**	**Mott MacDonald Ltd.**
CONTRACTOR	**:**	**Daewoo Engineering & Construction Co., Ltd.**

This page is a record of all revisions of this document. All previous issues are hereby superseded and are to be destroyed.

DOC. CLASS	T/1
DIST. CODE	18/19

REV	DATE	REASON FOR ISSUE	PREP	CHKD	REVD	APP'D	COMPANY
0	27 Oct 2010	Issued for Construction	D. Bhandari	A. Mesquita	D Y Kim	M Heo	
A	16 August 10	For Review & Comment	C Wardman	D Y Kim	J Brand	M Heo	
SIGNED (Initials)							

NOTES:

(a) Revisions are denoted by a vertical line placed in the right-hand margin against the revised text.

(b) PREP = Prepared by, CHKD = Checked by, REVD = Reviewed by, APP'D = Approved by.

(c) In case of conflict between any requirements stipulated in this document with the contractual requirements, the contractual requirements shall prevail.

REVISION INDEX DETAILS

Rev	Location of Change	Brief Description of Change

CONTENTS

1. INTRODUCTION

1.1 Purpose

The purpose of this procedure is to ensure that all welding and cutting activities are carried out with minimal risk of injury, damage to equipment or fire.

1.2 Scope

This procedure covers all welding and cutting operations carried out within the work scope of CONTRACTOR's PROJECT.

2. DEFINITIONS AND ABBREVIATIONS

COMPANY	-	Abu Dhabi Oil Refining Company (TAKREER)
CONTRACTOR	-	Daewoo Engineering & Construction Co., Ltd. or DAEWOO
PROJECT	-	EPC-4: Tankage & Associated Interconnecting Piping for Ruwais Refinery Expansion (RRE) Project
WORK	-	Means and includes all work and services to perform and GOODS and other things to provide by CONTRACTOR for EPC-4 Package of RRE Project.
SUBCONTRACTOR	-	any person, firm, or company, employed by CONTRACTOR to perform any work or duty on their behalf
Home Office	-	Execution location of the PROJECT's engineering and procurement activities in Seoul, Korea
UAE	-	United Arab Emirates
SITE	-	Location of the Project in Ruwais, Abu Dhabi, UAE
AGREEMENT	-	means the Signature Agreement, the Articles of Agreement and the EXHIBITS
Document	-	Any form, letter, facsimile, contract, subcontract, specification, requisition, drawing, or record of any kind required to transmit information from one party to another. It also includes computer generated drawings, lists, charts etc., and other data used to form a permanent record of the Project progress and "As-Built" condition.

3. RESPONSIBILITIES

3.1 Project Manager

The Project Manager is responsible in ensuring that the requirements of this procedure are adhered strictly during execution of the project.

3.2 Section Manager

The Section Manager is responsible for ensuring that;

- Monitoring and checking of the compliance of this procedure
- All the Machine and hand tools for welding, cutting and grinding operation, used on the site have been inspected and are safe to use. Apply for necessary work permit.
- Manpower, equipment and funds are available to purchase and use and maintain the machine and hand tools for welding, cutting and grinding purposes.

3.3 HSE Manager

The HSE Manager is responsible for ensuring that, all machines and power tools used for welding, cutting and grinding activities shall meet the Korean standard (KOSHA) or international standard and personnel are fully trained and aware of the safe use.

3.4 HSE Supervisor

The HSE Supervisor is responsible for

- Identifying the construction activities that could lead to injury or property damage.
- Ensuring that JSA related to activities are properly conducted.
- Monitor that all safe practices mentioned in this procedure for welding, cutting, and grinding jobs are implemented at site and PTW in place.

3.5 Supervisors

The Supervisors are responsible for safe operation of all welding cutting and grinding jobs. Necessary work permits to be completed before starting the task.

4. TERMINOLOGY

4.1 Plasma cutting

Plasma Cutting is a process that is used to cut steel and other metals (or sometimes other materials) using a plasma torch. In this process, an inert gas (in some units, compressed air) is blown at high speed out of a nozzle; at the same time an electrical arc is formed through that gas from the nozzle to the surface being cut, turning some of that gas to plasma. The plasma is sufficiently hot to melt the metal being cut and moves sufficiently fast to blow molten metal away from the cut.

4.2 Flashback arrestor

Flashback arrestor is a device most commonly used in oxy-fuel welding and cutting to stop the flame from burning back up into the equipment and causing damage or explosions. A flash back arrestor shuts off gas flow and extinguishes the flame before it can reach your gas source. Several factors can cause flash back, including failing to purge line properly, using improper pressure, leaks in the gas management system and improper system operation.

5. HAZARDS IN CUTTING AND WELDING

Welding is, in itself, not regarded as a hazardous occupation, but there are many hazards associated with this work, these include:

- Fire and explosion risks exist with both oxy-acetylene and arc welding, and many of the safety precautions already described are related to these hazards and must be taken at all times.
- Electric shock.
- Ultra-violet and infrared rays emitted during welding can cause skin irritation and burns similar to sun burning.
- Arc eye, which is a burn of the outer cell layers of the eye caused by ultra-violet rays.
- Infrared rays, which can damage the lens of the eye. This injury can occur when the eye is exposed to the rays emitted by molten metal.
- In the high temperature of welding, certain noxious fumes are formed.
- Nitric oxide formed from oxygen and nitrogen in the air. Is toxic, has a delayed action, and is difficult to detect as it is not irritating at the time of exposure.
- Ozone formed from oxygen. Is a highly toxic, irritant gas, has a distinctive smell and a delayed action. Ozone can also cause fire and explosion, as it is a very powerful oxidising agent.
- Phosgene formed from degreasing agent, when welding is commenced before the surface is completely dry, is toxic and has a delayed action.
- Carbon monoxide formed when welding metals coated with tar, bitumen, paints and varnishes, or contaminated with oil. Also formed when carbon dioxide is used as an inert gas for shielded arc welding, is very toxic.
- While welding galvanised metal, alloys containing zinc, cadmium, mercury, antimony, chromium, tin, copper, or steel coated with any of these metals, fumes of toxic oxides can be formed. These fumes can cause a harmful action on the lining of the respiratory tract. Adequate ventilation of the working place can minimise or even exclude the danger from toxic gases. As a guide, the U.S. Occupational Safety and Health Administration (OSHA) requires that a minimum of 65 cubic metres (2000 cubic feet) of air be moved per minute for each welder in a room. If this cannot be arranged, breathing apparatus must be worn.
- Injuries caused by the scattering of hot particles of metals when welding, and using the correct protective clothes and equipment can prevent pieces of slag when a weld is being cleaned.

6. PREVENTION OF INJURY

6.1 Eye Injuries

Eye injuries can occur as a result of exposure to radiant energy emitted during arc welding or when plasma or flame cutting operations are undertaken.

Prevention from this of injury can be achieved by the person carrying out the welding or cutting operation, wearing approved eye protection in the form of full face shield filter with the appropriate dark lenses for welding and approved dark goggles in the case of cutting. For personnel who are working within the area that may also be affected by the welding or cutting activities, welding screens will be erected around the welding or cutting activity to effectively shield, those working close by from flash burns to the eye. All such screens will be manufactured from a suitable non-reflective, fire retardant material and should be erected in such a manner as not to restrict ventilation of the working area. It should also be noted that all personnel will be required to wear, as a minimum for general site work, safety spectacles fitted with side shield. The wearing of this item of personal protective equipment will not provide protection from flash burns to the eyes. Damage to the eye can also occur from the ingress of hot slag, sparks or flying debris caused by chipping, cleaning-up or grinding of a weld. At all times while performing these activities, it shall be mandatory for additional eye protection to be worn, such as a full face shield.

6.2 Contact Lenses

The use of contact lenses is prohibited during welding and cutting operations. Any worker related to welding & cutting work depending on their trades shall be interviewed to check if they wear contact lenses during the medical examination before employment and they will be advised not to wear them during the operations.

6.3 Burns

- Thermal: Burns of the skin from hot metal, spattered slag or metal, or from handling hot objects such as tools, rods or the work may be effectively prevented by the use of protective clothing such as arm and leg guards, aprons, shirts and gauntlets. Warning signs or barricades shall be considered to avoid injury to another worker such as burn injury by touching welded parts in a congested or busy traffic area after welding.
- Radiant: Risk of burns from radiant energy to the unprotected skin of the welder (Such as arms, neck, ears or face) is easily prevented by the wearing of protective clothing. The use of ultra-violet barrier creams (e.g. Uvistat ointment) may also be considered in certain situations.
- **Note:** Clothing made from standard grades of nylon and other man-made fibers is not recommended for protection against thermal or radiant burns.
- All personnel directly involved in welding and cutting shall wear suitable flame-resistant protective clothing, in addition to safety boots, helmets, etc. Such clothing shall include but not be limited to:
  - leather jackets
  - leather gauntlets / gloves
  - Flame-proof or flame-retardant overalls.

6.4 Prevention of Electric Shock

All portable welding machines and generators will be positively earthed by a 1meter earthing stake manufactured from suitable material (copper bonded ground rod) driven into the earth to a depth of at least 300mm.

All welding earths will be connected as close as possible to the workplace or area where the welding is taking place.

Welding earths shall not, under any circumstances be connected to any scaffolding, scaffold component or rigging equipment.

Welding cables shall be kept dry and free from grease and oil to prevent breakdown of insulation. Cables with exposed bare conductors shall be replaced or discarded immediately.

Welding cables shall, where practicable, be one continuous length. Should it be necessary to connect two or more cables, only purpose made, approved connectors shall be used for this purpose.

All welding machines, welding cables, hand pieces, etc shall be inspected by competent person (Color Coding Procedure -5578-E4-HSE-HU-00018) prior to being used in the Project site.

All welding machine 240V power outlets shall be protected by a core balanced earth leakage protection circuit breaker set to trip at 30milliamperes.

All welding and associated equipment will be inspected and tagged in accordance with the Equipment Inspection color coding procedure.

6.5 Toxic Fumes and Respiratory Protection

Welding, cutting and brazing operations produce mixtures of gases, fumes and smoke of which the composition will depend on a number of factors such as base metal, welding temperature, type of electrode and flux, metal covering, contamination, shielding gases, etc.

Other gases, fumes and smoke are produced from the burning of the base metal, welding rods, metal coatings, containments (e.g. solvents), fluxes, etc. The fumes consists mainly of iron oxide but oxides of zinc, manganese, nickel, antimony, copper, cadmium, etc, can be present, as well as fluorides.

Metal surfaces may be coated with protective films of lead paint, zinc galvanizing, cadmium, oil or plastic. When these surfaces are heated other toxic fumes are generated.

To ensure protection of the person carrying out the welding or cutting operation from inhalation of toxic fumes or vapors adequate exhaust ventilation shall be provided.

In locations where adequate exhaust ventilation is not possible, welding can be carried out safely by personnel wearing suitable respiratory protection. Demand air supply or positive air supply types of equipment are recommended.

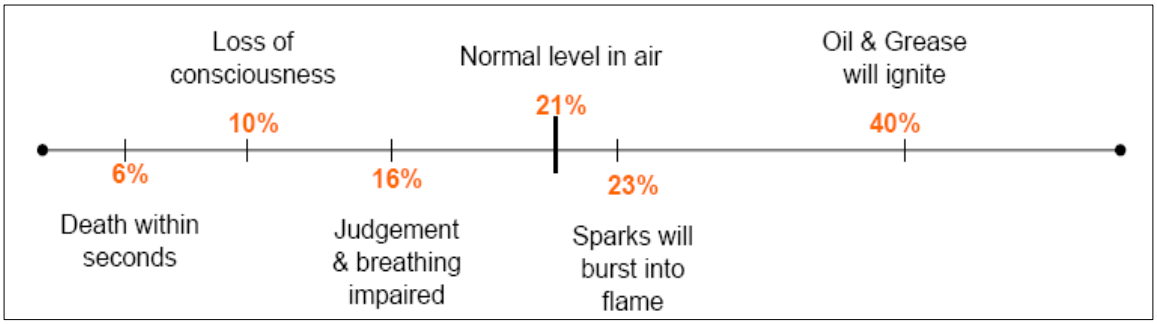
Dust or fume masks do not provide adequate protection.

NOTE: Welding or cutting in enclosed spaces such as tanks can seriously deplete the oxygen content of the air. Adequate ventilation is essential, supported by the welder wearing an air- supplied respirator when necessary.

6.6 Oxygen Enrichment

Oxygen enrichment gives no warning; it is tasteless, odorless and colorless. It can bring on a feeling of Euphoria. An oxygen enriched situation can be easily catch fire; textile can burn fiercely without even noticing any signs of danger. Pressurized oxygen is not for blowing dust or cleaning clothing. Oxygen can saturate the material making 8 times more flammable.

Oxygen/acetylene hoses and gauges shall be kept free of any oil or grease containments, especially at the threaded connection between hoses and gauges.



7. PREPARATION FOR WORK

A Work Permit may be required issued from HSE team prior to the start of a welding or cutting job, unless the work is to be done in an uninterested area or one specially designated for the purpose. For welding or cutting inside new vessels and equipment, a Confined Space Entry Permit shall be obtained even if the work is being carried on inside a designated area.

The Work Permit shall specify all stand-by safety and fire-fighting equipment, which shall be available at the workplace before the start of work. Special precautions shall be taken regarding screening, scaffolding (ramps and toe boards), location of welding set, and the position, handling and use of gas cylinders.

Welders and burners shall be skilled tradesmen. Helpers will work under the supervision of a welder or burner.

CONTRACTOR HSE team will issue Work Permits for all works up to the time of start up or the facilities is hand over to the client.

COMPANY will issue Work Permits for all work after Ready for Start-Up.

8. WELDING

8.1 Installation/Removal of Purge Dams

CONTRACTOR or its subcontractors shall install and remove purge dams in accordance with a procedure written by piping section of construction and approved by HSE team and QA/QC team. An approved JSA shall be made; all the known risk associated with the task and the mitigating measure to be applied shall be indicated in the JSA.

Piping section or subcontractors shall maintain a log of all purge dams, recording date of installation and removal.

Piping supervisor in charge shall witness the removal of all purge dams and initial records accordingly.

A copy of CONTRACTOR piping supervisor/Subcontractors current purge dam log shall be forwarded to Piping Section.

Subcontractor and CONTRACTOR personnel are not permitted to enter confined spaces for the purpose of installation or removal of purge dams without a Confined Space Entry Permit (5578-E4-HSE-HU-00015) from HSE team.

NOTE: Purge dams shall be installed at suitable distance from the weld end preparation; a minimum of 150mm for small bore pipe is recommended. The material for purge dams must be heat resistant up to 200~300℃. Purge dams connectors and rope line from purging dam to end of the pipe shall be made of non-combustible materials (e.g. small diameter chain, binding wire).

8.2 Housekeeping

Housekeeping shall be maintained to a high standard in all areas especially where welding is taking place. All welding stubs, used grinding discs, etc, will be contained in a receptacle provided by sections responsible in the work activities, and located at the work place. All such receptacles shall be emptied daily and to be dumped in the designated area.

8.3 Routing of Cables and Hoses, etc.

All welding electrical cables/hoses and compressor hoses shall be suspended by an approved means (not tied up with bare metal or sharp wire) at least 2meters from the ground or working platform. If it is not practical to route cables or hoses overhead of a work/traffic area, cables and hoses will be routed under the platform to eliminate any tripping hazards, and shall always be kept out of water.

8.4 Fire Prevention

Prior to commencement of any hot work activity the area that is affected shall be free of all flammable material (combustibles: wood, paper, plastic, etc; flammable materials: petrol, diesel, paint, thinners or mastic insulation, etc).

At least one fully charged 9kg Dry Chemical powder fire extinguisher will be provided immediately adjacent to the hot work area and near welding machine.

Employees engaged in hot work shall be trained in the operation of fire extinguishers before being allowed to carry out any hot work. Hot work in elevated areas shall have a fire retardant blanket (non-asbestos type) strategically placed to ensure the capture of all sparks and/or hot metal that may be produced by the hot work. Hot material or sparks shall not be allowed to fall or be carried into any other work area, which may affect the safety of other personnel or equipment (100% Sparks Containment)

9. CUTTING

9.1 Gas Cutting

- Inspection of Equipment

  All equipment associated with gas cutting operations shall be subject to inspection prior to use on the worksite. Items such as hoses, gauges, regulators, torches and flash-back arrestors will be inspected by Competent Person before use is permitted and must be in good and serviceable condition. On-going inspections of such equipment shall be carried out by HSE team during safety audits.

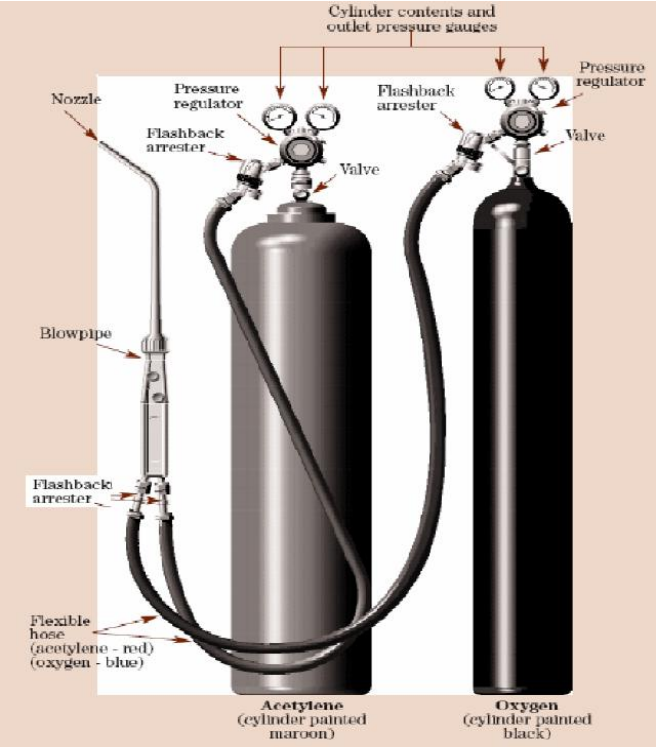
- Use of Flash Back Arrestors

  CONTRACTOR procedures on torches and regulators require installing Flashback Arrestors in the torch and on the regulator of both the oxygen and fuel gas cylinders. Flashback arrestor must be of the correct type and size. By setting the correct gas pressure and using the right equipment and gas supply, the occurrence of flashbacks can be minimized. Flashback arresters are important safety devices which are required to be fitted to the torch and regulator to protect both the operator and equipment in cutting and burning situations.

NOTE:

Prevention of flashback starts by selecting the size cylinder or number of cylinders of acetylene to adequately supply the flow rate to the tip. The followings are another cause of back feeding or reverse flow.

- Incorrect operating procedures
- Incorrect purging of the system on start up
- Blocked or undersized tip or nozzle
- Faults in gas hose fittings, resulting from wear & tear, dirt, etc.
- Blocked gas passages in the blowpipe, cutting attachment, welding attachment or heating head
- Kinked or restricted hoses
- Incorrect diameter hose
- Insufficient gas supply
- Incorrect selection of flashback arrestors



- Ignition of Torches

  Gas torches shall not be ignited by any means other than an approved flint gun. Cigarette lighters, matches, matches or hot metal will not be used as an ignition source.

- Gas Cylinders, Gauges, Hoses, Torches

  Gas Cylinders

  Gas cylinder valves should be closed, and the valve protection cap shall be in place, hand-tight, when gas cylinders are not in use.

  Under no circumstances should oil or grease be used to lubricate any valves or connections which may come in contact with oxygen under pressure.

  Gas cylinders shall be stored in areas specially defined for the purpose, i.e. outdoors, away from all sources of heat and away from elevators, gangways and other traffic hazards. Oily rags, waste and other refuse should not be allowed to accumulate on or near stored gas cylinders. Gas cylinders should be protected against extremes of weather and direct radiation from sun or hot equipment.

  Full gas cylinders of oxygen and fuel gas should be used in rotation as they are received from the supplier.

Oxygen and fuel gas cylinders shall be stored separately with a minimum separation distance of 6 meters or can be stored by constructing in between a 1.5 meter high non-combustible barrier with a fire resistance of 1 hour and 30 minutes.

Fuel gas cylinders shall be placed with valve end up, and secured from falling whenever they are in use or stored.

A cradle, boat or similar platform closed on all sides, should be used when gas cylinders are transported by crane or derrick. Slings or electro-magnets shall not be used for this purpose.

When gas cylinders are moved by hand, they may be tilted and rolled on their bottom rim. When gas cylinders are transported by vehicle they shall be secured in upright position. Gas cylinders shall not be dropped, nor will they be permitted to strike violently against any other object.

Valve-protection caps shall not be used for lifting gas cylinders from one vertical position to another.

It is not necessary to remove the regulators and replace the valve-protection caps when gas cylinders, (which are in use), are moved by means of a gas cylinder trolley, specially designed for the purpose.

Gas cylinders which are not mounted in such trolley during use shall be secured with a suitable steadying device to prevent them from being knocked over.

Gas cylinders in use shall be kept far enough away from any welding or cutting operation to prevent them from coming into contact with sparks, hot slag, hot metal or flame.

Gas cylinders shall not be placed where they might become part of an electric circuit. Contact with radiators, piping systems or layout tables which may be used as ground return circuits for arc welding machines should be avoided.

Never strike an arc against a cylinder.

Gas cylinders shall not be placed under structures where valves could be damaged by falling objects.

The numbers and markings stamped on gas cylinders should not be tampered with.

NOTE: Gas cylinders must be pre-color coded by the suppliers in line with international color codes. Where colors do not clearly distinguish contents, name of contents shall be clearly marked on bottles.

Empty gas cylinders shall be marked and segregated from full gas cylinders.

Gas cylinders whether full or empty shall not be used as rollers or supports, or for any other purpose.

The contents of a gas cylinder shall not be used for any purposes other than those intended by the supplier.

Gas cylinders shall only be re-filled by authorized persons or suppliers. No person other than the gas supplier shall attempt to recharge gas cylinders.

If a valve leak develops, the gas cylinder will be removed from service, suitably tagged, placed outdoor, away from any source of ignition, with an appropriate warning sign and the supplier notified.

- Gauges/Valves

Before an oxygen cylinder is put into service, the valve should be opened slightly then closed immediately. This action is known as “cracking” (shifting) the valve, and is intended to clear the valve of dust or dirt which might otherwise enter the regulator. Valves on Acetylene/Propane or Butane gas

cylinders should not be cracked near welding work, sparks, flames or other sources of ignition. The operator should stand on the side opposite from the outlet when cracking the valve.

Regulators should be used only for the type of gas indicated by the supplier and should be of a design pressure appropriate to the pressure of the filled gas cylinders on which they are to be used. If regulators or their parts have to be repaired, the work should be performed by a skilled and properly trained mechanic only. In general, it is recommended that regulators be returned to the supplier for repair, calibration or adjustment.

To ensure their accuracy, gauges attached to the regulators should be. The section in charge shall maintain a log of all such calibrations. Oil should never be used to test the accuracy of gauges used on oxygen cylinders. Faulty seats in the unions on regulators may result in gas leaks and shall be replaced.

After the gas cylinder valve has been 'cracked' and closed again, the regulator should be connected to the gas cylinder and tightened with the correct size open-end spanner, never use a pipe wrench as these will cut into the connection nuts, (Adaptors are required to attach some acetylene regulators to the valves). Soapy water may be used to ascertain that a tight connection exists between the regulators, adaptors, and cylinder valves. Care should be taken to avoid getting oil or grease on the fittings when connecting an oxygen regulator.

To avoid error when connection hoses, the oxygen regulator connections have right-hand threads; fuel gas regulator connections have left-hand thread. Connections should be tight to avoid leakage.

Unless special means have been provided to protect the regulators, the pressure-adjusting screw of the regulator should be released, i.e. turned counter-clockwise (to the left) before the gas cylinder valve is opened.

The fuel-gas cylinder valve should be opened slowly with the special key or handle provided for that purpose. The valve should be opened more than 12 turns, and the key should be kept in place. The pressure in the gas cylinder will then be shown by the high-pressure or cylinder-contents gauge.

The oxygen cylinder valve should be opened slightly so that the high-pressure gauge hand will move up slowly. The valve should never be opened suddenly, and the operator should not stand directly in front of the gauge faces. After the high-pressure gauge hand has stopped moving, the oxygen-cylinder valve should be opened fully.

If the low-pressure gauge on the regulator show a continuous and steady increase in pressure when the torch valves are closed, the gas cylinder valve should be closed immediately and the regulator repaired.

When regulators are to remain out of service for an extended period internal valve seats should be protected by relieving the pressure on the seat by means of the pressure adjusting screw. Care should be taken to re-set the pressure adjusting screw before the regulator is placed back into service.

- Hoses

Hoses are manufactured in distinctive colors for ready identification. Red is generally recognized for fuel-gas hoses, and green for oxygen hoses. Hoses color coding shall followed the site or country color coding standards for gas hoses. Hose connections on the regulator should be similarly marked for identification

Only hoses manufactured to standard specifications are acceptable to be used in site.

Parallel lengths of oxygen and gas hose should be taped together to prevent tangling.

Hoses shall only be connected by means of approved fittings and securely fastened with approved clamps (e.g. 2 ear crimp clamp) in such a manner to withstand pressure of twice the maximum delivery pressure downstream of the regulator without leakage.

2 Ear Crimp Clamp

1 Ear Crimp Clamp with crimping Tool

Approved Type of Hose clamp

Screw (Jubilee, Worm) Type Clamp

Spring Type Hose Clamp

Not approved Type of Hose Clamp

Hoses shall be protected from kinking, tangling, being stepped on, run over by trucks or otherwise damaged.

Contact of hoses with oil or grease shall be avoided to reduce deterioration of the rubber.

Spare hoses shall be stored in a cool place, and away from direct sunlight.

Hoses shall be inspected frequently for leaks, wear and lose connections. Leaks may be detected by immersion of the hose in water under normal working pressure or by using soapy water solution. Leaking hoses shall not be used in site.

If a hose shows wear it shall be repaired or replaced immediately by section in charge.

9.2 Plasma Cutting

All equipment associated with plasma cutting shall be subject to the same safety considerations as those for Welding, section 9 above.

10. PERSONAL PROTECTIVE EQUIPMENT

Welder's protective clothing is designed to cover the body completely. This is necessary to protect the welder from burns, which can be caused by heat, ultra-violet and infrared radiation, sparks and scattering of hot particles.

The following precautions must be taken:

- Welders' overalls should not have any pockets, or 'turn ups' on the trousers, where sparks could be caught.
- Leather or other flame resistant aprons give additional protection against heat, sparks and flames and must always be worn while welding.
- Capes or shoulder covers made of leather or other flame resistant material must be worn when welding is to be done above head level.
- Eyes must be protected by well fitting goggles fitted with the correct filter glass. Welders and their assistants must use goggles even when wearing helmets and screens. The screens can then be lifted if necessary. Welding shields must be suitable for protection against molten metal and hot particles and conform to the requirements of BS EN 175: 1997 Personal protection: equipment for eye and face protection during welding and allied processes, or an equivalent specification. It must be used in conjunction with appropriate welding filter – BS EN 169 or EN 379).
- A welder must always as a minimum use a helmet type protector, eye wear that has UV protection and hand shield type protector, which covers and protects his eyes and head.
- Hands must be protected by flame resistant gauntlets, which come high over the sleeve.
- Fire resistant leggings or high boots must be used for heavy work. For light work safety boots with reinforced toes must be worn.
- Fresh air line mask will provide protection from noxious fumes in all places where ventilation is poor. It must be used when working in confined spaces.

11. ATTACHMENT

Gas Equipment Inspection Register

Attachment

GAS EQUIPMENT INSPECTION REGISTER

Every calendar quarter requires a documented complete gas equipment inspection by sections designated Competent Person. With completion of this register and application of the projects color code onto each of the listed equipment. All gas equipment need to be listed on this register.

DESCRIPTION & SERIAL NUMBER	**WEEKLY INSPECTION DETAILS**								**DATE :**	
(List all gas equipment. All equipment must be marked by a serial number)	GAUGE STATUS	FLASH BACK ARRESTOR	CLIP STATUS	GAS HOSE	CYLINDER CONDITIONS	CONTROL VALVE	TORCH	LEAKAGE	INSPECTION DATE	INSPECTOR SIGNATURE

Comments :

Status : √ = O.K. X = Unsatisfactory see comments