



Safety and Health Manual



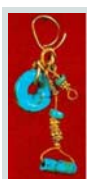
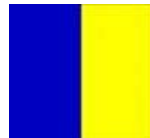
**PAKPAS GROUP OF COMPANIES**

# QUALITY ASSURANCE HAND BOOK SAFETY PRACTISES BASICS

*safety comes first*



File No: 8829.523.545.591.88



**SAFETY PRACTISES AND  
QUALITY ASSURANCE BOOK**



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### ENGINEERING STANDARDS ES- 500

## SAFETY PRACTICES

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PAKPAS	SAFETY PRACTICES	DATE	PAGE	SYMBOL	UNIT N°	CAT	TYPE + FORMAT	SERIAL No.	REV.
	ES-500	26/01/2010	1/22	SPE	00	A	UE	0270	11

# ENGINEERING STANDARD ES-500

## SAFETY PRACTICES BASICS




**Safety  
Starts here**

	<b>SAFETY PRACTICES</b> ES-500	DATE 26/01/2010	PAGE 2/22	SYMBOL SPE	UNIT N° 00	CAT A	TYPE + FORMAT UE	SERIAL No. 0270	REV. 11
---	-----------------------------------	--------------------	--------------	---------------	---------------	----------	------------------------	--------------------	------------

## TABLE OF CONTENTS

1. SCOPE
2. RESPONSIBILITY
3. TRAINING
4. PERSONNEL PROTECTION
  - 4.1. Protective Clothing, Gloves, Safety Shoes etc.
  - 4.2. Eye and Face Protection
  - 4.3. Safety Helmets
5. FIRE PRECAUTIONS
  - 5.1. Fire Extinguishers
  - 5.2. Fire Fighting Training
6. HOT WORK PERMIT SYSTEM
7. WORK SAFETY
  - 7.1. Regulations for Safety Work Protection
  - 7.2. Excavations
  - 7.3. Nails
  - 7.4. Scaffolding and Working Above the Ground Level
  - 7.5. Handling Machines
  - 7.6. Machinery
  - 7.7. Site Electrical Installations
  - 7.8. Storage & Handling of Products & Material
    - 7.8.1. Dangerous Products & Materials
    - 7.8.2. Cylinders of Compressed, Liquefied or Dissolved Gases
    - 7.8.3. Storage and Marking of Cylinders.
  - 7.9. Welding
    - 7.9.1. Equipment
    - 7.9.2. Safety Precautions
  - 7.10. Radiography

 <b>PAKPAS</b> <small>"Quality comes first"</small>	<b>SAFETY PRACTICES</b> <b>ES-500</b>	DATE 26/01/2010	PAGE 3/22	SYMBOL SPE	UNIT N° 00	CAT A	TYPE + FORMAT UE	SERIAL No. 0270	REV. 11
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## 1. SCOPE

This specification covers the basic elements of safety general to all site activities such as Civil works, welding, handling, etc.

## 2. RESPONSIBILITY

**2.1.** Site Manager shall be responsible must designate approved areas where welding and cutting operations may be carried on safely. When these operations must be done in other than designated areas, Site Manager must assure that procedures to protect personnel and property are established and followed.

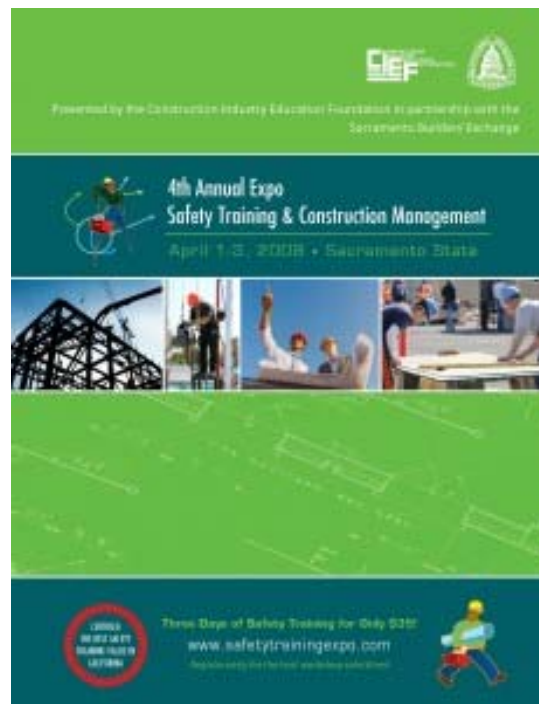
**2.2.** The Safety Supervisor must be certain that only approved equipment and processes are used.


## 3. TRAINING

Through and effective training is a key aspect of a safety program.

The proper use and maintenance of the equipment must be taught for example defective or worn electrical insulation can not be tolerated in arc welding or cutting.

Persons shall be trained to recognize safety hazards. If they are to work in an unfamiliar situation or environment, they should be thoroughly briefed on potential hazards involved.



	<b>SAFETY PRACTICES</b> <b>ES-500</b>	<b>DATE</b> 26/01/2010	<b>PAGE</b> 4/22	<b>SYMBOL</b> SPE	<b>UNIT N°</b> 00	<b>CAT</b> A	<b>TYPE + FORMAT</b> UE	<b>SERIAL No.</b> 0270	<b>REV.</b> 11
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## 4. PERSONNEL PROTECTION

### 4.1. Protective Clothing, Gloves, Safety Shoes, etc.

**4.1.1.** The wearing of safety shoes is strongly recommended. Low shoes with unprotected tops shall not be worn.

**4.1.2.** Welders Shall wear clothing to protect from Ultraviolet light all exposed skin areas. All clothes shall be free from oil and grease. Dark colored shirts are recommended to minimize reflection of UV rays under the helmet. Shirt collars and cuffs should be kept buttoned, and pockets should be removed from the front of overalls.

**4.1.3.** Durable gloves of leather or other suitable material shall always be worn during welding and related process.

**4.1.4.** The wearing of protection gloves and protection spectacles is compulsory for cutting, grinding, welding

**4.1.5.** The wearing of safety belts is compulsory wherever there is a risk of falling and work is being performed at a height without the provision of a guard rail and or joined floor. Safety belts must be in good condition and fastened so as to avoid a fall of more than one meter.



**4.1.6.** Properly fitted, flame resistant ear plugs shall be worn whenever operations pose spark or hot spatter risks.

### 4.2. Eye and Face Protection


The welding arc should never be observed at close quarters with unprotected eyes. A helmet type head shield will be used for protecting the welders' face and eyes from the direct rays of the arc.

	<b>SAFETY PRACTICES</b>	<b>DATE</b>	<b>PAGE</b>	<b>SYMBOL</b>	<b>UNIT N°</b>	<b>CAT</b>	<b>TYPE + FORMAT</b>	<b>SERIAL No.</b>	<b>REV.</b>
	<b>ES-500</b>	26/01/2010	5/22	SPE	00	A	UE	0270	11

**4.2.1. Recommended Lens Shade Number for Use in Various Welding Operations.**

<u>Welding or Cutting Operation</u>	<u>Current A</u>	<u>Shade No</u>
Shielded Metal Arc Welding	Under 60	7
	60-160	10
	160-250	12
	250-550	14
Gas Metal Arc Welding and Flux Cored Arc Welding	Under 60	7
	60-160	11
	160-250	12
	250-550	14
Gas Tungsten Arc Welding	Under 50	10
	50-150	12
	150-500	14
Air-Carbon Arc Cutting	Under 500	12
	500-1000	14
Oxyfuel Gas Cutting (Steel)	<u>Thickness mm</u> Under 25	3, 4
	25-150	4, 5
	Over 150	5, 6
Oxyfuel Gas Welding (Steel)	Under 3.2	4, 5
	3.2-12.7	5, 6
	Over 12.7	6, 8



	<b>SAFETY PRACTICES</b>	<b>DATE</b>	<b>PAGE</b>	<b>SYMBOL</b>	<b>UNIT N°</b>	<b>CAT</b>	<b>TYPE + FORMAT</b>	<b>SERIAL No.</b>	<b>REV.</b>
	<b>ES-500</b>	26/01/2010	6/22	SPE	00	A	UE	0270	11

**4.2.2.** Lenses in head shields and face shields shall be protected from breakage and from spatter by a cover lens or plate which is clear glass that is treated to resist damage from spatter.

### **4.3. Safety Helmets**

The wearing of safety helmets by all personnel is compulsory on the site and refinery area. The requirement applies to all visitors as well. Failure to comply with this will result in severe disciplinary measures.

Safety helmets will confirm the following requirements.

- Orange helmets for Contractor personnel
- Red helmets for fire and safety personnel

In addition, the Contractor mark of the identification will appear on each helmet.

## **5. FIRE PRECAUTIONS**

### **5.1. Fire Extinguishers**

**5.1.1.** Contractor installations must have fire extinguishers in accordance with the applicable fire regulations. These extinguishers must be periodically inspected.

**5.1.2.** Fire extinguishers must also be carried in all Contractor vehicles. Fire extinguishers must be available in work areas and near inflammable materials. Contractor will, at their cost follow precisely all instructions specified by Contractor Safety Supervisor in the furtherance or fire precautions.

**5.1.3.** It is strictly forbidden to fill fuel tanks of vehicles or equipment with the engine running.


### **5.2. Fire Fighting Training**

The Customer will, if considered necessary, provide training for the Contractor personnel in the use of fire extinguishing equipment. In any case, the Contractor personnel shall be inducted on the correct handling of such equipment besides Fire Precautions specified by the Customer. The Contractor shall ensure that all personnel are well aware of those.

**5.3.** Combustible and flammable materials shall be stored in specific locations and isolated from the other stored material.

**5.4.** Fuel gases, such as acetylene or propane or other common flammable often found in cutting and welding areas. Special attention shall be given to fuel gas cylinder, hoses and apparatus to prevent gas leakage.

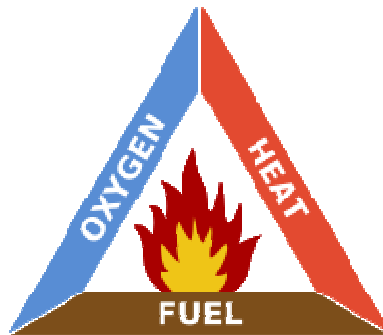
**5.5.** Combustibles that can not be removed from welding area shall be covered with tight fitting, flame resistant material.


 PAKPAS <small>"Quality comes first"</small>	<b>SAFETY PRACTICES</b>	<b>DATE</b>	<b>PAGE</b>	<b>SYMBOL</b>	<b>UNIT N°</b>	<b>CAT</b>	<b>TYPE + FORMAT</b>	<b>SERIAL No.</b>	<b>REV.</b>
	<b>ES-500</b>	26/01/2010	7/22	SPE	00	A	UE	0270	11



5.6. Personnel shall be alert for traveling vapors of flammable liquids. Vapors are often heavier than air and can travel along the floors and in depressions for distances of several hundred feet from where the flammable liquid is stored.

5.7. A through examination for evidence of fire shall be made before leaving the work area. Fire inspection shall be continued for at least 30 minutes after the operation is completed.



 PAKPAS <small>"Quality comes first"</small>	<b>SAFETY PRACTICES</b>	<b>DATE</b>	<b>PAGE</b>	<b>SYMBOL</b>	<b>UNIT N°</b>	<b>CAT</b>	<b>TYPE + FORMAT</b>	<b>SERIAL No.</b>	<b>REV.</b>
	<b>ES-500</b>	26/01/2010	8/22	SPE	00	A	UE	0270	11

## 6. HOT WORK PERMIT SYSTEM

**6.1.** When welding, cutting or similar hot working operations are to be performed in areas not normally assigned for such operations a hot work permit system shall be used.

**6.2.** The purpose of the hot working system is to alert area supervisors to an extraordinary danger of fire that will exist at a particular time.

**6.3.** The permit system shall include a check list of precautions that includes an inspection for fire extinguishers, establishment of fire watches if necessary, search for flammable materials.




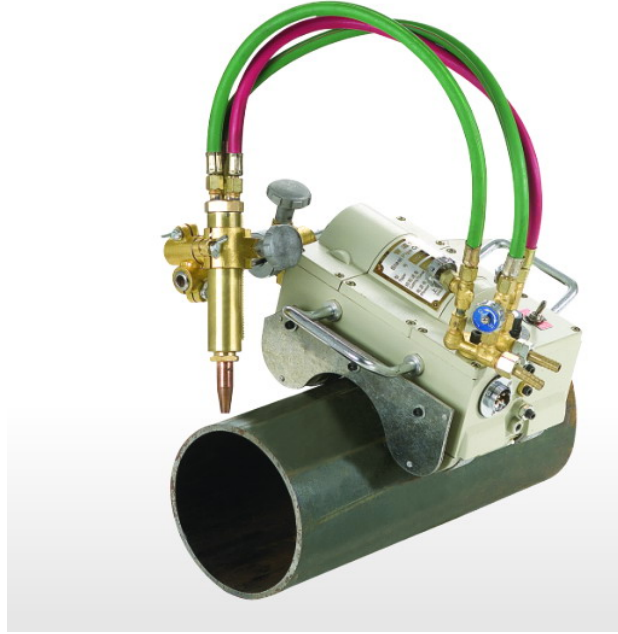
## 7. WORK SAFETY

### 7.1. Regulations for Safety Work Protection

**7.1.1.** All the work concerning Civil Engineering must be in accordance with the regulation for safety and work protection-Laborers and Health and Job Safety Regulations in Construction Works. Official Gazette No: 15004 dated September 12 th 1974.

**7.1.2.** The discharge tube or emission of any tool such as a compressor, nail or rivet gun, whether operating or not, shall never be directed at or near a person.

	<b>SAFETY PRACTICES</b>	<b>DATE</b>	<b>PAGE</b>	<b>SYMBOL</b>	<b>UNIT N°</b>	<b>CAT</b>	<b>TYPE + FORMAT</b>	<b>SERIAL No.</b>	<b>REV.</b>
	<b>ES-500</b>	26/01/2010	9/22	SPE	00	A	UE	0270	11



**7.1.3.** Tools and materials must not be left where they may fall or drop.

**7.1.4.** Tools and materials must not be thrown or dropped from any scaffolding or other place.

**7.1.5.** When the fire alarm sounds all work operations must stop in the area. When the Contractor personnel hear a fire alarm, they shall turn off any fire hydrant valve that they may have permission to draw water from. If flame work is involved they will have to suspend work until the signal at the end of the alarm period has been given.


**7.1.6.** At the end of the daily work all electric supplies must be switched off.

## **7.2. Excavations**

The Contractor shall obtain necessary work permits prior to any kind of excavation and be strictly careful about the special restrictions indicated in the permits by the Customer, such as manual excavation or by using excavators, etc. The protection from openings, edges and excavations shall be maintained by means of the following installations and/or methods;

**7.2.1.** Covers over holes must be secured against removal or be clearly marked to prevent removal.

**7.2.2.** Open jousting through which a man may fall must be covered to provide safe access.

	<b>SAFETY PRACTICES</b>	<b>DATE</b>	<b>PAGE</b>	<b>SYMBOL</b>	<b>UNIT N°</b>	<b>CAT</b>	<b>TYPE + FORMAT</b>	<b>SERIAL No.</b>	<b>REV.</b>
	<b>ES-500</b>	26/01/2010	10/2 2	SPE	00	A	UE	0270	11

**7.2.3.** Excavations, shafts or pits must be protected at the edges by guardrails, barriers or be securely covered so as to prevent persons falling in.

**7.2.4.** Barriers or guardrails may be moved temporarily for access or movement of plant, but must be replaced as quickly as possible.

**7.2.5.** An approval from the Customer shall be obtained for the commencing excavation which will cause an obstruction to the free passage of vehicles and emergency services.

**7.2.6.** Every care should be taken to avoid any damage to underground services. Any damage caused shall be reported to the Customer immediately.

**7.2.7.** All excavations should be inspected everyday before the commencement of any further work and thoroughly examined at least once in seven days to follow the conditions which may affect the stability of the work

**7.2.8.** Crossing over trenches should be by means of solid and wide enough gangways provided with strong handrails.


**7.2.9.** Any unearthing of underground pipes, electric cables or other permanent fittings will enforce immediate cessation of the operation in the area of excavation and Contractor will inform Customer representative immediately who will decide on appropriate action.

**7.2.10.** A space of 40 cm to 60 cm wide around each excavation must be kept clear of any tools or materials. A visible protection will be placed around the excavation.

**7.2.11.** If any excavation is to be left open at night, a traffic area must be marked out and indicated with appropriate markers and/or lights.

**7.2.12.** Crossing over trenches must be by means of a solid 1 m wide gangway made of joined elements and fitted with strong handrails.



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	<b>ES-500</b>	26/01/2010	11/2 2	SPE	00	A	UE	0270	11

### 7.3. Nails

Any planks with protruding nails must be stacked carefully away until the nails can be removed. Such planks will not be left lying around.

### 7.4. Scaffolding And Working Above The Ground Level


**Refer Scaffolding Safety Hand Book ES-500-01**

Persons shall not work in a place from which they are liable to fall, unless they are provided with suitable equipment to prevent falling. Consideration shall be given to the safety of all persons working above the ground level and the following precautions observed.



**7.4.1.** Provide and maintain safe access to and from the work place, scaffolding & working platforms.

**7.4.2.** Provide fully constructed scaffolding with handrails and toeboards. Where there is not practicable cradles, working platforms and safety nets or harnesses must be used.

 PAKPAS <small>"Quality comes first"</small>	<b>SAFETY PRACTICES</b>	<b>DATE</b>	<b>PAGE</b>	<b>SYMBOL</b>	<b>UNIT N°</b>	<b>CAT</b>	<b>TYPE + FORMAT</b>	<b>SERIAL No.</b>	<b>REV.</b>
	<b>ES-500</b>	26/01/2010	12/2 2	SPE	00	A	UE	0270	11

**7.4.3.** Precautions should be taken for the below working persons when a work is being performed at heights.

**7.4.4.** Competent personnel shall be provided to erect scaffoldings and working platforms with proper material.

**7.4.5.** Periodical inspection shall be maintained for those installations by the Safety Supervisors of the Contractor and Customer and the necessary replacements or modifications shall be carried out if any part is rejected by the supervisors.

All materials for scaffolding must at all times, be in good condition and be subjected to inspection by Customer Safety Officer. All materials rejected by the Customer Safety Officer will be immediately replaced with material fulfilling the requirements at the Contractor own expense.

## **7.5. Handling Machines**


No material handling machine such as crane, conveyor, pallet truck, etc., may be used for movement of personnel except by specific permission of Customer in each instance. Permission will be withheld if approved safety apparatus is not used.

Prior to commencing any lifting Operations near overhead cables or an electrical installations Contractor must obtain Customer permission and will follow all Customer's instructions to take appropriate precautions.

No cable can be anchored or tied to existing structures of items of material or equipment without Customer representative's prior approval.

No crane will be permitted to move when loaded unless it is specially designed for such a purpose and only within the limits of the loads. Where cranes are required to move in the working areas a qualified workman must guide the driver.



 PAKPAS <small>"Quality comes first"</small>	<b>SAFETY PRACTICES</b>	<b>DATE</b>	<b>PAGE</b>	<b>SYMBOL</b>	<b>UNIT N°</b>	<b>CAT</b>	<b>TYPE + FORMAT</b>	<b>SERIAL No.</b>	<b>REV.</b>
	<b>ES-500</b>	26/01/2010	13/2 2	SPE	00	A	UE	0270	11

## 7.6. Machinery

**7.6.1.** All machinery with gears or belts will be fitted with strong protection devices.

**7.6.2.** All machinery will be subjected to inspection by Customer's Safety Officer. Contractor will provide at their own cost all safety devices requested by Customer.

## 7.7. Site Electrical Installations

Electrical installations shall be undertaken by the Contractor on the site and connected to any power supply as per the terms of the Contractor. All electrical equipment including cables, apparatus and materials shall be suitable for their purpose and shall conform to all statutory and Contractor requirements. All installations shall be performed in a safe manner and prior to any connection for the supply of electrical power, the work shall be notified to the Customer to get the required special work permit.

The Contractor shall provide the following precautions regarding safety work on electrical installations :

**7.7.1.** Cables shall be free from defect and suitable for their purpose. Insulation to the ground and phase to phase shall be un-damaged.

**7.7.2.** Every electrical joint and connection shall be of good construction and have an insulation phase to phase and to the ground of not less than that of the cables.


**7.7.3.** Circuit breakers and fuses shall be arranged effectively in order to maintain well protection of electrical equipment and cables.

**7.7.4.** Conductors shall not be subjected to dynamic stresses, besides cable sheaths shall fully penetrate inlets into equipment and shall be secured with suitable clamps or glands to eliminate any mechanical stresses on the conductors.


**7.7.5.** Cables shall not be routed along the ground, whenever possible, cables shall be carried on poles above the ground level.

**7.7.6.** The Contractor shall protect all overhead power lines in their respective areas and accesses by means of suitable barriers and signs. Barriers should be constructed of vertical wooden posts and cross members.

**7.7.8.** Barriers and sign shall be installed at sufficient distance from overhead lines to ensure that no electrical contact is made between the plant and equipment power lines.

 PAKPAS <small>"Quality comes first"</small>	<b>SAFETY PRACTICES</b>	<b>DATE</b>	<b>PAGE</b>	<b>SYMBOL</b>	<b>UNIT N°</b>	<b>CAT</b>	<b>TYPE + FORMAT</b>	<b>SERIAL No.</b>	<b>REV.</b>
	<b>ES-500</b>	26/01/2010	14/2 2	SPE	00	A	UE	0270	11

- 7.7.9.** Every panel shall have its own incoming circuit breaker or switch-fuse to provide protection against overloads and short circuits.
- 7.7.10.** Every user shall be supplied from the panel through individual circuit breakers or switch-fuses. (User is defined as an electrically supplied item of equipment, including cranes welding machines, saws, pumps and lighting installations).
- 7.7.11.** Electrical equipment shall be of a standard, suitable for the environment in which it is installed.
- 7.7.12.** Electrical equipment installed outdoors shall be of an approved weather-proof standard.
- 7.7.13.** Clear and un-obstructed access shall at all times be provided to the panels in order that maintenance and operation can be undertaken safely.
- 7.7.14.** Exposed conductive parts of equipment are to be effectively earthed, connections between conductor sections shall be either soldered or bolted and fastened with lugs, terminals or bushing. Effective methods shall be taken to ensure that the connections are secure and electrically safe.
- 7.7.15.** No work or testing shall be undertaken to Earthing systems unless the equipment is electrically isolated.
- 7.7.16.** During operations construction, Earthing systems are liable to become defective, regular tests shall be made to ensure that effective Earthing is maintained.
- 7.7.17.** Equipment enclosures shall be effectively earthed before any power connection is made.
- 7.7.18.** The max. permitted voltage shall be 220 V for fixed lighting installations.
- 7.7.19.** Overhead lighting fittings shall be located at least 3.0 meters above transit and working areas.
- 7.7.20.** Exposed conductive parts of lighting fixtures, including their supports shall be effective earthed.
- 7.7.21.** Lighting installation shall be of a standard suitable for the environment in which they are installed.
- 7.7.22.** The use of portable equipment with a voltage exceeding 24 volts is prohibited for lighting purposes.
- 7.7.23.** All electrical equipment used must be in accordance with the Regulations in force. The use of such electrical equipment can be prohibited by Customer if all the guarantees are not presented by the Contractor.

	<b>SAFETY PRACTICES</b>	<b>DATE</b>	<b>PAGE</b>	<b>SYMBOL</b>	<b>UNIT N°</b>	<b>CAT</b>	<b>TYPE + FORMAT</b>	<b>SERIAL No.</b>	<b>REV.</b>
	<b>ES-500</b>	26/01/2010	15/2 2	SPE	00	A	UE	0270	11



**7.7.24.** The connection of any electrical installation of any Contractor can only be made after inspection and approval of a Customer inspector and in compliance with the safety regulations.

If any Contractors installations are considered dangerous the supply of electricity to these installations will be disconnected.

## **7.8. Storage & Handling Of Products & Materials**

### **7.8.1. Dangerous Products & Materials**

Dangerous products such as inflammable fuels, paints, explosives, etc. (as determined by Customer Safety Officer) must be stored in specially isolated places surrounded by fences and clearly marked in accordance with the Safety Regulations for each product. The same regulation will apply to radioactive sources used for the radiography of weldings etc. Prior permission for locations and type of storage must be obtained by the Contractor from Customer.

### **7.8.2. Cylinders of Compressed, Liquefied or Dissolved Gases**

**7.8.2.1.** Special attention is called to the danger represented by these cylinders and the care which must be taken in using them. Contractor must ensure that all risks of falls, collisions and other impacts which could damage the taps and valves must be avoided.


#### **7.8.2.2. Cylinder gases**

Pressurized gas cylinders shall be marked to identify the type of gas content by means of stenciling, stamping or labeling. Furthermore, those cylinders will have identifications to provide information about the name of the manufacturer, date of manufacturing, operating pressure & volume. The Customer's code of marking shall be used to identify different types of cylinder gases.

**7.8.2.3.** The storage of cylinders shall be done separately in groups according to their contents. Empty & charged cylinders shall be stored separately too. The storage place shall be well ventilated and equipped with fire extinguishers of sufficient size & amount. Cylinders shall be placed in an upright position.

**7.8.2.4.** Cylinders shall be secured against any movement during transportation, besides their valves should be well protected.

**7.8.2.5.** Cylinders shall only be used with the correct type and size of pressure regulators and valves. Exposure to the sun or other heat sources should be avoided for the cylinders in use. Cylinders shall not be used in greasy or oily conditions. Cylinder gases shall be used for their specific purposes but not as substituting each other.

	<b>SAFETY PRACTICES</b> <b>ES-500</b>	DATE 26/01/2010	PAGE 16/2 2	SYMBOL SPE	UNIT N° 00	CAT A	TYPE + FORMAT UE	SERIAL No. 0270	REV. 11
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**7.8.2.6.** Oxygen Cylinders should never be handled with oily and greasy hands, clothes or gloves.

**7.8.2.7.** Acetylene Cylinders must always be kept in an upright position and should never be completely emptied in order to prevent the leakage of acetone. No fitting made of copper or its alloy are permitted to be used on Acetylene Cylinders not prevent formation of Copper Acetylene which may cause easy ignition.

**7.8.2.8.** LPG cylinders should be kept and used separately from the oxygen cylinders to prevent formation of explosive mixtures.

**7.8.2.9.** All accessories and attachments used with cylinder gases should be in good condition. Hoses should be inspected prior to be used and the connections must be made by the use of effective clips or crimps. Later usage of a hose for another kind of gas is strictly forbidden, therefore correct & different coloring is required for the hoses according to each type of gas flow.

**7.8.2.10.** Pressure regulators must always be fitted to cylinders in use and the defective ones should immediately be changed.

**7.8.2.11.** Flashback arrestors shall be used at the torches to prevent explosions.

**7.8.2.12.** Cylinders of dissolved or liquified gases must not be stored or used horizontally.

**7.8.2.13.** Oxygen must never be used instead of compresses air.


**7.8.2.14.** Every type of cylinder must be protected against sources of heat sun, flame, welding sparks and blow lamps etc.

### **7.8.3. Storage and Marking of Cylinders**



Single padlock  
secures both doors

Divided sections for segregation  
offer adjustable plated steel  
chain to hold cylinders in place

 PAKPAS <small>"Quality comes first"</small>	<b>SAFETY PRACTICES</b>	<b>DATE</b>	<b>PAGE</b>	<b>SYMBOL</b>	<b>UNIT N°</b>	<b>CAT</b>	<b>TYPE + FORMAT</b>	<b>SERIAL No.</b>	<b>REV.</b>
	<b>ES-500</b>	26/01/2010	17/2 2	SPE	00	A	UE	0270	11

**7.8.3.1.** Oxygen cylinders placed vertically must always be fastened rigidly.

**7.8.3.2.** All cylinders in service must have a key on them so that they may be closed at once in case of emergency.

**7.8.3.3.** Cylinders of any description, whether in use or not, must be clearly marked indicating the contents.

## 7.9. Welding

### 7.9.1. Equipment


The Contractor should obtain authorization from the Customer prior to undertaking any welding on the site within the Units.

All welding equipment (including cables and flexible tubes) must be in good condition and must be handled only by qualified personnel.

Cables and flexible tubes must be placed in such a manner so as to avoid any contact with any other article that might damage them (e.g. hot parts electric cables, areas of traffic etc.) Earthing cables must be connected to the ground by a reliable contact device which will not cause overheating or sparks. Earthing cables must not cause a flux of returning current through materials that could be damaged, such as but not limited to :

- Oxygen cylinders acetylene cylinders or any compressed gas container.
- Containers of petrol, oil or other inflammable liquids.
- Piping in service, electrical conduits.
- Wire ropes.
- Mechanical gears, etc.



 PAKPAS <small>"Quality comes first"</small>	<b>SAFETY PRACTICES</b>	<b>DATE</b>	<b>PAGE</b>	<b>SYMBOL</b>	<b>UNIT N°</b>	<b>CAT</b>	<b>TYPE + FORMAT</b>	<b>SERIAL No.</b>	<b>REV.</b>
	<b>ES-500</b>	26/01/2010	18/2 2	SPE	00	A	UE	0270	11

Contractor welding electrodes should be stored on site, in a clean and dry condition, at a Contractor temperature.

### 7.9.2. Safety Precautions

Prior to working (welding) in the area, Contractor shall ensure that the welder may carry out the works without the risk of being injured by falling objects and that he is not exposing himself to risks when his helmet blocks his view. The below actions should be provided by the Contractor in order to start any welding activity :

**7.9.2.1.** The welding machines with transformers should be checked well that a strong and effective isolation is maintained between primary and secondary windings

**7.9.2.2.** The connection to the power supply shall be done by means of a board-mounted switch with a suitable fuse.

**7.9.2.3.** Terminal boards for welding machines shall be effectively protected to prevent the personnel from having contact with any live part.

**7.9.2.4.** Metal frames of the welding machines shall be securely earthed.

**7.9.2.5.** As soon as the welding stops, the welder or his helper shall turn off the switches on the machine and board.

**7.9.2.6.** Execution of welding above ground level will be after taking the necessary precautions to prevent any harm due to falling are sparks.


**7.9.2.7.** The holding of the electrode holders at the same time connected to two different welding machines is strictly forbidden.

**7.9.2.8.** Welders shall wear suitable safety equipment such as goggles, gloves, helmets, etc. and the other workers in the vicinity of welding shall be protected from the harmful effect of welding as well.

**7.9.2.9.** Dry equipment must be used.

**7.9.2.10.** Metallic jewelry is not to be worn.

Commencement of any welding operations must have a prior agreement by a qualified engineer and especially if the operation is on a dangerous job, such as, but not limited to, welding on small containers, tanks that have contained products, areas of inflammable products, structures under tension, welding on vehicles, etc.

	<b>SAFETY PRACTICES</b> <b>ES-500</b>	<b>DATE</b> 26/01/2010	<b>PAGE</b> 19/2 2	<b>SYMBOL</b> SPE	<b>UNIT N°</b> 00	<b>CAT</b> A	<b>TYPE + FORMAT</b> UE	<b>SERIAL No.</b> 0270	<b>REV.</b> 11
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### 7.10.1. Radiography


Bringing the radiation sources to the site and using them require authorization from the Customer.

**7.10.1.1.** A specially constructed pit shall be located on the site of temporary facilities provided that a secure fence around the pit and also legal warning signs are available. The access for the fence gate and the cover of the pit shall have locks preventing un-authorized persons to enter and handle the source. The location of the pit shall be far away from offices and other habited buildings but inside the boundaries of the fenced area for temporary facilities. The location and the design of he pit will be shown to the Technical Safety Dept. of the Customer for their approval.



**7.10.1.2.** The Contractor shall ensure that the personnel engaged in Radiography are qualified and competent to carry out these activities. The personnel shall be registered by the official authority of the Turkish Government, TAEK (TURKISH ATOMIC ENERGY ASSOCIATION).

**7.10.1.3.** On-site radiography should be authorized by the Customer and the daily permits for restricted areas should be obtained.

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	<b>ES-500</b>	26/01/2010	20/2 2	SPE	00	A	UE	0270	11

**7.10.1.4.** Utilization of  $\gamma$ -Ray or x-ray Radiography should be carried out on site providing a secure distance from the other persons, by warning signs & barriers.

**7.10.1.5.** Radiation should be continuously monitored during the execution of the work in order to provide the safe distance for radiographers, radiation not to be exposed more than 2.5 millirems per hour. The personnel for radiography shall have pocket type dosimeters and film-badges to determine the exposed total radiation. The determinations, recorded daily from the dosimeters and monthly from the film-badges will be developed by TAEK and reported to the Contractor.


**7.10.1.6.** A radiation log-book shall be kept by the Supervisor of Radiography in order to record daily exposures of the personnel and in case the permissible dose rates are exceeded, then the subject personnel shall be medically examined and the necessary action will be taken.

**7.10.1.7.** The utilization of radioactive sources and X-Ray/Gamma Ray equipment must be done in security areas prohibited to other personnel or must take place when other personnel are not in the area. The prohibited and dangerous areas must be clearly marked out (as instructed by Customer Safety Officer) and must be watched by the operators.

**7.10.1.8.** Personnel engaged on work with radiography will carry in their person a device acceptable to Customer which will evaluate quantities of radiation and which will be subject to periodic inspection by Customer delegated representatives. Failure to comply with these requirements will be subject to instant dismissal.

**7.10.1.9.** All Contractor equipment, films and chemicals required for the purpose of welding Contractor shall be at the Contractor expense.

**7.10.1.10.** The utilization of X-Ray/Gamma Ray equipment by a supplier must be fully licensed by the appropriate Authority.

	<b>SAFETY PRACTICES</b> <b>ES-500</b>	<b>DATE</b> 26/01/2010	<b>PAGE</b> 21/2 2	<b>SYMBOL</b> SPE	<b>UNIT N°</b> 00	<b>CAT</b> A	<b>TYPE + FORMAT</b> UE	<b>SERIAL No.</b> 0270	<b>REV.</b> 11
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	ES-500	26/01/2010	22/2 2	SPE	00	A	UE	0270	11