1.0 INTRODUCTION:

Arc welding uses an electrical power supply to create an electric arc between a welding electrode and the base material, to melt the metals at the welding point. Arc welding requires the use of either direct (DC) or alternating (AC) current, and consumable or non-consumable electrodes. The welding region is usually protected by some type of shielding gas.

This guideline aims to promote safe use of welding and gas cutting equipment’s, provide guidance to safeguard the HSE aspects at the workplace by mitigating the risk associated with the job.

This guideline defines, identifies and describes methods of safe hot work i.e. working with welding and gas cutting which may be lead to potential accidents.

This guideline provides employers and employees with safety and health information on electric welding / gas cutting processes.

2.0 SCOPE:

The scope of this guideline is for all “arc welding and gas cutting” works to be carried out within the jurisdiction of Dubai world.
3.0 GUIDELINES:

3.1 Welding Machine & Connections

- Select the correct welding machine depending upon the type of metal to be welded.
- Ensure that connection is done by certified electrician.
- Keep the welding machine away from the source of heat.
- Ensure that the cables are not causing a tripping hazard.
- Ensure that the return cable is firmly connected to the job and the negative terminal of the welding machine.
- Do not overload the welding machine.
- Switch off the power supply to the machine when not in use.

3.2 HOT WORK PERMIT

- Obtain Hot work Permit from the area supervisor & to be closed daily.
- Cordon off the area & display “Permit to work” form where welding work is carried out.
- Welding operations shall be shielded by non-combustible or flameproof screens to protect people working in the close vicinity from glare & ultra violet rays.
- Welding or cutting work shall be performed away from the flammable goods storage.
- Flammable containers shall be drained, washed, dried thoroughly & purged with inert gas before carrying welding operations on it.

3.3 WELDING ROD, HOLDER, CABLE & EARTHING

- Do not bend the welding electrode.
- Ensure that the holder is properly insulated.
- Welding cable should be completely insulated, flexible & capable of handling the maximum current requirements of the work.
- Any Pipe lines (waterline, drainage line), and metal pipe lines containing gases or flammable liquids or electrical conduits shall not be used as a ground return.
- Do not keep the electrode in the holder when not in use.
3.4 FIRE FIGHTING EQUIPMENT & PPE

- Provide appropriate firefighting equipment as (fire extinguishers, fire hose reels etc.) prescribed by the Civil Defense.
- Firefighting equipment’s shall be immediately available in the work area and shall be maintained in a state of readiness for instant use in case of fire
- Workers shall be protected by suitable eye, face, hand, body, foot & respiratory protective equipment.

3.5 FUME EXTRACTION SYSTEM

- Provide adequate mechanical fume extraction & / or forced ventilation whenever work is not carried out in the open air.
- Do not weld near vapor degreasers or on metal that has been just degreased. The decomposition of chlorinated hydrocarbons used in vapor degreasers can form into a poisonous gas.
- Gases that may be present in welding and cutting fume are:- nitrous oxide (NOx), Carbon dioxide (CO2), Carbon monoxide (CO), Shielding gas (eg Argon, helium) and ozone (O3)

3.6 TRAINING & FIRE WATCH

- Contactors must provide training to employees about the safe means of arc welding and cutting.
- A person who is trained (certified by EHS/EHS Approved 3rd party) on firefighting shall be assigned as a firewatcher to maintain a watch for flying sparks resulting from the welding operation within 11 meters (35 feet) area.
- A fire watch shall be maintained for at least a half hour after completion of welding operation.
- Different levels of fire watch need to be provided while working at height (scaffolding, MEWP etc.)

3.7 HOUSEKEEPING

- Contactors must ensure that work area is clean before and after the work
- Welding electrode waste must be collected & disposed separately
3.8 LOCATION OF WORK & TROLLEY

- Keep the flammable storage away from the gas welding & cutting operation.
- Keep & store the gas cylinders away from the source of heat.
- Always keep the gas cylinders vertical in a trolley & tied with chain.
- Do not lift gas trolley with crane.

3.9 FLASH BACK ARRESTOR, HOSE PIPES & PRESSURE GAUGES

- Ensure that Flash back arrestors are provided on both the cylinders.
- Provide RED color hose pipe for Acetylene cylinder & GREEN for Oxygen cylinder.
- Hose pipes must be connected with proper clamps.
- Maintain pressure gauges in working condition.
- Torch should be kept free from molten metal slag.

3.10 STORING GAS CYLINDERS

- Oxygen cylinders in storage shall be separated from flammable gas cylinders or combustible materials, a minimum distance of 6 meters (20 feet) or by creating a noncombustible barrier at least 1.5 meters (5 feet) height with a fire-resistance rating of at least half hour or more. (30 minutes).
- Gas cylinders shall be stored in a well-ventilated shed made up of non-flammable material.
- Keep the valve caps in place.
- Full and empty cylinders should be stored separately. Storage location should be arranged so that the old stock of cylinders can be removed first. Cylinders should not be exposed to continuous dampness. They should not be stored near salt water or corrosive chemicals or fumes. Corrosion can weaken the cylinder. This can eventually lead to a sudden rupture or explosion.
- Store cylinders away from welding and cutting work. They should not be exposed to falling objects, moving machinery, and vehicular traffic.
- Storage areas should be located where cylinders will not likely get knocked over. Cylinders should be secured by suitable means such as chains or straps.
3.11 Electrical Hazards

The arc welding process requires a live electrical circuit. This means that all arc welders using hand held equipment will be at risk of electric shock and electrical burns.

- Ensure that the welding equipment conforms to the appropriate international/local standards.
- Installation of fixed welding equipment is carried out by a suitably qualified person and is connected as recommended by the manufacturer.
- Ensure that the insulation on the welding and current return leads/cables is undamaged and the conductor is thick enough to carry the current safely.
- Never coil the electrode lead/cable around your body.
- Ensure that all connectors are clean, undamaged and correctly rated for the current required.
- Don’t use welding equipment with damaged insulation on the welding cables, plugs, clamps or torch/electrode holder.
- Use the appropriate personal protective equipment for the task.

3.12 Confined Spaces

- Flammable gases may be present in the confined space and it may lead to accidents. Welding fumes can accumulate more rapidly, with a higher concentration; gases can force out the breathable air, suffocating the workers involved in the process. Adequate fresh air supply needs to be provided to the worker in order to perform the job
- Working in the confined spaces needs to be minimized wherever possible
- Mandatory Gas Test need to be conducted for the below type of gases
  - Test for oxygen
  - Test for combustible gases and vapors
  - Test for toxic gases and vapors

3.13 First Aid

- The welding area should always be equipped with a fire blanket and a well-stocked portable first aid kit.
- At least one trained in first aider need to be available close to the work area to treat the minor injuries that may occur.

4.0 REFERENCES:

- DM Regulations, Code of Construction Safety Practice
- Occupational Safety and Health Administration-US www.osha.gov
- Health and Safety Executive UK www.hse.gov.uk