Kingdom of Saudi Arabia
Ministry of Interior
General Directorate of Civil Defense

Regulation of Safety and Protection Requirements in The Field of Cutting and Welding

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Chapter 1

1st: Definitions:

The terminologies in this regulation mean:

1. **Cutting and welding equipment**:

All industrial equipment and machinery used in cutting or welding process of, either by electricity, oxygen, rays (Plasma), etc.

2. **Cutting and welding processes**:

All technical and industrial processes or metal welding, whether carried out within a dedicated and licensed facility (workshop) to practice this business, or those carried out at construction sites, industrial facilities, pipelines or external installations.

3. **The Law**:

Civil Defense Law issued by Royal Decree No. M/10 and dated 10/5/1406 H and all other relevant regulations.

4. **Regulation of Inspection, forfeiture, investigation, and penalties**:

The Regulation issued by HRH, the Minister of Interior, and the President of the Civil Defense Council to determine the procedures of inspection, forfeiture, and investigation of violations and misuses related to civil defense works and the penalties imposed on them.

5. **Civil Defense Representative**:

The authorized person or persons by the General Directorate of Civil Defense, or one of its centers to carry out inspection, forfeiture, and investigation of violations as per the rules and procedures specified in the relevant Regulation, to ensure the safety of the building, safety equipment, and tools, and to impose the penalty stipulated.

6. **The relevant authority**:

The Ministry of Interior, the General Directorate of Civil Defense, and other public authorities involved in the facility's license and workers and monitoring the business.

7. **Safety Officer**:

According to Article 25 of the Civil Defense Law, the safety officer is the person appointed or assigned to be responsible for all safety and industrial security matters, either in the licensed facility or businesses required the process of welding and cutting, subject to this regulation. The property owner or the licensee is responsible for safety in all cases.

8. **Specifications**:

a) Saudi Standards: issued by the Saudi Standards, Metrology, and Quality Organization, SASO.
b) International Standards: in the absence of Saudi Standards, the United States of America Standards, or the Standards of the European Common Market Countries shall be considered. If the equipment or material is manufactured in other countries (other than US or EU countries), In that case the specifications must be confirmed by the manufactured countries' relevant authorities. A document must be submitted to prove the availability of all safety rules in equipment or material used in all cases.

2nd : According to article (20) of the Civil Defense Law, the licensee shall not be permitted to establish any new cutting & welding facility, renewing, renovating or expanding the existent facility until he submits a technical study prepared by one of the technical offices specialized in safety engineering, industrial security and firefighting and approved by the General Directorate of Civil Defense. This study explains the extent of compliance with the rules mentioned in this regulation and the existing business will be allowed a period determined by Civil Defense from the time of issuing this Regulation in order to apply the requirements and instructions stated in this regulation. The relevant body of municipalities shall consider granting a license or renewing it as per this regulation.

3rd: The office that prepared the study mentioned above have to answer to the Civil Defense and other relevant authorities about the accuracy of the study and monitoring its implementation. The office shall undertake to provide a final certificate confirming the compliance of the business with the terms and conditions included in this Regulation. The office shall be considered responsible in solidarity with the warehouse owner for any default or neglect in this regard.

4th: The safety officer shall be responsible for conducting monthly inspections and periodic tests (every three months) for the facility, or the tools and equipment used, and all electrical and mechanical installations, plus all safety methods and equipment and firefighting. All repairs related to any defects or malfunctions must be carries out immediately. Failure to do this shall be considered severe negligence.

5th: The safety officer undertakes in the event of any malfunction or failure involving a high degree of risk to stop or shutdown the tool or equipment (the source of danger) immediately and disconnect it from the power source (electricity or any other source) and prevent the use of it until it is inspected and repaired by specialists. He must evacuate the facility if the situation required and contact Civil Defense center immediately to consider proper arrangements.

6th: The safety officer in the facility must personally ensure that there are no presences of highly flammable materials near cutting and welding equipment while operated (running) and must ensure that there are no such materials in the spark range resulting from cutting and welding processes.

7th: In case cutting and welding process must be done outside the licensed facility, such as construction sites, factories or pipelines, etc., the safety officer in these facilities and in coordination with his counterpart in the licensed facility of cutting and welding process, and before carrying out the process, and after obtaining the necessary license, must do the following:

a) Contact the Civil Defense Center to indicate the nature of the facility, the type of cutting and welding processes required, the locations, time needed to complete the job, necessary safety measures, and the fire and rescue intervention plan, etc.
b) The welding area and the surroundings must be clear of any flammable petroleum materials or other combustible materials that might ignite due to heat or sparks.
c) Workers carrying out cutting and welding tasks must be qualified and skilled.
d) The facility's fire and safety squads must be equipped with the appropriate equipment, placed on standby, and distributed/ deployed throughout the site after explaining the proposed plan and ensuring that everyone is fully aware of his role.
e) Agreeing with Civil Defense on the proposed plan to send a representative to oversee safety arrangements before and during cutting and welding operations if possible.
f) Any cutting or welding process of pipelines (supply-distribution lines), petroleum tanks, flammable materials or related materials must not be performed before taking all practiced safety measures locally and internationally to secure the site. Failure to do so shall be considered severe negligence.

8th: The safety officer shall assign a register called (safety and firefighting record) according to the application form prepared by Civil Defense. All pages are stamped with the seal of the Civil Defense. All the monthly inspections and periodic tests of fire,

monitoring, alarm methods, the dates, results, repair works and other data are recorded in this register. Part of this record is dedicated to the building inspection and maintenance works and the building's electrical installations. The record must be kept within the facility management so that the register is at the disposal of civil defense representative at all times to view and write notes, or fines in it.

9th: All workers must be trained on fire & rescue, and ambulance in schools and national training institutes approved by the General Directorate of Civil Defense, or coordinate with Civil Defense incase these schools or institutes are not available in order to conduct these courses. The training requesting party bears the costs of such, or its share of the course costs based on the cost of one trainee.

10th: The safety officer in the facility undertakes to contact the relevant Civil Defense Center before performing any outside works (outside the facility) related to cutting and welding to acquire the necessary permit for this. This comes after submitting a full report on the type, nature, duration and safety and prevention arrangements of the job.

Chapter 2

First: The conditions for licensed shops for cutting and welding (cutting and welding workshops).

a) **Site**:

Establishing cutting and welding workshops is subject to prior authorization from the relevant authority (municipalities) while complying with the designated areas to practice this business. This regulation focuses on safety and fire requirements necessary for the facility without considering the rest of the licensing requirements and engineering conditions for buildings constructions that fall within the jurisdictions of municipalities and other relevant bodies.

b) Building:

1. The workshop buildings must be constructed of non-flammable materials and fire-resistant for at least two hours.
2. Welding and cutting process must be carried out on dedicated platforms made of non-flammable materials with high fire resistance.
3. Workshop flooring must be covered with tiles or cement and fire resistant without any holes or cracks in it and completely clear of oils, greases or petroleum liquids.
4. The doors and windows should be made of metal, reinforced glass for windows.
5. Storing any flammable or explosive materials in the workshop is prohibited.
6. No welding or cutting is allowed outside the workshop.

c) Means of Escape:

1. The workshop must have sufficient doors for equipment to be moved into and out of the workshop during repairing. The numbers of doors increase based on the area of the workshop and the size of the equipment.
2. At least one alternate door for personnel must be provided in each workshop other than the main entrance, and lead to the outside where fresh air is available.
3. All doors and exits should lead to open roads, to facilitate evacuation during emergencies.

d) Electrical installations:

1. All electrical installations in the workshop must comply with the technical specifications issued or approved by SASO. Installations and periodic maintenance must be carried out every two months by specialized technicians.
2. All installations should be inside insulating tubes, explosive proof types.
3. Grounding of equipment and devices must be carried as Saudi Standards.

e) Ventilation:

1. Adequate natural ventilation must be provided in the workshop through windows and openings.
2. The necessary mechanical/artificial ventilation must be provided as per Saudi Standards.
3. Insulate, fix and secure ventilation ducts and chimneys as per Saudi Standards.

f) Firefighting equipment:

1. The workshop is equipped with sufficient numbers of fire extinguishers (dry chemical powder and Co^2 types), capacity (12 kg). The numbers are determined according to the area and the amount of the work at the workshop, and after considering Civil Defense Center view. The numbers of fire extinguishers must not be less than four regardless of how small is the workshop area.
2. The workshop is equipped with a number of fire hose reels near the entrances and exits and within large area workshops, one hose reel for each (100) M^2.
3. Provide a number of fire buckets filled with clean and dry sand.
4. Provision of water source to supply the hose reels, supply should be sufficient in terms of water volume and pressure.
5. The workshop must be equipped with a first aid kit, kit items must be suited to type of risks for this business, such as: burn cream, disinfection materials and bandages until the ambulance arrives or the injured transported to a hospital.

g) In addition to the previous requirements included in the first item, the rest of requirements included in the regulation must be implemented:

1. Special requirements for operating, maintenance of cutting and welding equipment and machinery must be implemented as per item "2" of this section.
2. Preventive requirements when using liquefied (LPG) or industrial gases and others in cutting and welding works must be implemented as per item "4" of this section.

3. Precautionary measures while welding petroleum containers/tanks must be taken as per item 5 of this section.
4. Welders must use protective equipment such as: shields, helmets, and glasses … Etc., as per item "sixth" of this section.
5. Business owner must consider the implementation of adequate measures for workers safety as per item 8 of this section.
6. Cutting and welding process must be carried out by only competent and well trained workers, and aware of how to avoid the risks associated with these tasks. Workers must be aware of fire work and how to use fire extinguishers.
7. Welding or cutting areas are only for staff, anyone else is not allowed there.
8. Smoking or igniting any sources of fire in the welding area is prohibited; warning signs must be placed there.
9. Guide signs are placed as a reminder for workers and visitors about safety instructions to follow.
10. Instruction and warning signs as per the design adopted by the Civil Defense.

Second: **Conditions for cutting and welding machinery and equipment**, **operation and maintenance**:

1. **Machinery**, **welding equipment and cutting**:

a) All equipment must be installed by specialized technicians licensed to carry out these works in a way that guarantees the safety of workers and others.
b) Workers assigned to operate cutting and welding machines and equipment must be specialized and qualified for this purpose.
c) All machines and equipment must be of safe types, withstand high loads and high temperatures according to the machine's capabilities and capability and must be as per the technical specifications and approved by SASO.

d) High voltage installations must be well insulated and out of reach, workers must be warned not to touch or approach them.
e) Welding electrical installations must be protected from accidental contact by workers, or contact with metal objects such as cars and lifting device hooks. Etc.

2. **Grounding**:

a) The technical entity responsible for installing welding machines and equipment must conduct grounding for all machinery and equipment that require such procedure, taking into consideration that the undergrounding cable is sufficient enough to absorb accumulated electrical charges.
b) The negative current must not be connected to chains, wire ropes, lifting machines, elevators, etc.
c) When a structure or conductor is used as a welding circuit stream, the links must be connected or equipped with current assembly tools. Periodic inspection must be carries out by the dedicated technicians to ensure that no electrical or fire hazards due to this use.
d) All ground connections should be checked periodically to ensure their validity and ability to withstand the required current, while repairing any defect that may be detected in a timely manner.

3. **Supply connecters and connections**:

a) A disconnect switch or control unit must be provided at or near each welding machine that is not equipped with such a switch, overload protection must be provided, and protective means for each outlet ready to connect a mobile welding machine. This must be done as per Saudi Standards.

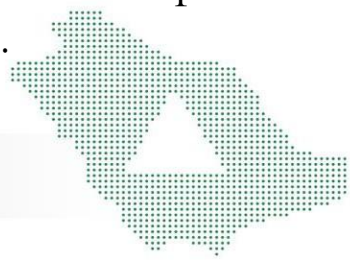
4. **Operating**:

a) Connections to the machine must be checked before operation to ensure that they are properly installed as the work link cable must be tightly installed. Magnet work clamps must be cleaned of metal particles to prevent them from being scattering on the contact surface (work bench), and the coiled welding cable must be stretched before using to avoid significant overheating, which may damage the insulation material.

b) The grounding of the welding machine structure must be inspected, special attention to the ground safety connections of the mobile machines.
c) Leakage of coolant water, gas or engine fuel must be prevented, and printed instructions on proper and safe operation must be prepared and carefully implemented.
d) Electrode holders should be placed when not in use so there is no electrical conduct with people, connected objects, fuel tanks or compressed gas.
e) The worker must not wrap the welding cable around his body.

5. Maintenance:

a) Periodic maintenance must be carried out for cutting and welding machines, their accessories and operation methods. This must be carried out by competent technicians, and according to the instructions prepared in this regard.
b) Worker must report any equipment malfunction/defect or hazards to his supervisor and stop using the equipment until it is safe to use. Only qualified personnel shall carry out the repair.
c) Wet machines must be completely dried and tested before use.
d) The machine must be operated as per the technical instructions prepared in advance as well as the welding machine, installations and cables. Welding workers are trained on these machines by a specialized technician and all installations must be capable to handle full load.
e) Flash welding machines must be equipped with a cover to control the flying glare where the materials may contain a layer of oil. Sufficient mechanical ventilation along with natural ventilation must be provided to avoid gases and fumes rising risks.
f) Operations of nearby equipment must be protected by using fireresistant barriers or appropriate protection that should be set up around the machine so the worker movement is not hindered.



g) Periodic maintenance must be carried out by competent maintenance workers; records of such maintenance are kept. The worker must be provided with instructions on how to stop operating the equipment until repairs are completed to achieve safety and protection.

Third: **Safety and prevention measures when performing cutting and welding operations at external sites** (**e.g.**, **construction sites**, **industrial facilities**, **pipelines**, **etc**.):

The following precautions must be considered:

1. Flammable materials/objects and means of fire must be removed from the location where the cutting and welding process will take place.
2. Fire-resistant barriers should be placed to contain sparks and heat and protect other materials/objects. Human supervision, and firefighting equipment should be ready in the area and work must be shut down immediately if the supervisor notices any hazards.
3. Precautions must be taken if cracks or holes in the floor or walls are present, to prevent sparks and fire spread through these cracks or holes.
4. The welding or cutting site must be equipped with the necessary number of manual fire extinguishers (various types) and fire hose reels and sand buckets as per Civil Defense estimate and following the area and size of operations and the site danger and its exposure to fire hazards.
5. During cutting or welding operations, one or more qualified safety personnel must be present to control the ignition hazards that may occur. The supervisor must stay for at least half an hour after the completion of welding or cutting works in order to detect and extinguish any possible fire and only leave the area after ensuring that there is no possibility of fire reignite.
6. An appropriate alarm method heard throughout the site should be prepared for emergency use.
7. Before authorizing the welding or cutting process, the area must be inspected by the person responsible for issuing the permits to carry out this process and with the participation of the safety inspector to take the appropriate precautions, in particular the following:

a) The welding area should be away from running manufacturing equipment.
b) The area should be clear of flammable liquids and gases unless needed to facilitate the necessary tasks, and they must be used, handled and stored in a safe manner while securing and protecting pipelines and drainage channels.
c) The license/permit to perform the cutting and welding process must include the designated location, and specifically the date and hour of start and finish of the work.
d) Flammable materials must be moved away at least ten meters from the cutting and welding area. If this is not possible, then they must be protected with fire-resistant covers, and covers edges must be firmly on the ground to prevent sparks from going under these covers.
e) In case cutting or welding process is done within a confined (closed) place, the atmosphere must be tested in this place, and no work is authorized unless gas or steam/fume percentage that can be ignited in the atmosphere is less than 15% of the minimum requirement to explosion, thus adequate ventilation must be provided to prevent ignition concentration.
f) Sewage should be protected or blocked within transport networks that may carry sparks to distant combustible materials.
g) Fire-resistant covers or protection must be provided where welding is carried out near walls, barriers, ceilings or combustible surfaces to prevent them from igniting.
h) Carrying out welding process on a barrier, wall, roof or metal surface covered/coated with flammable material is not allowed.
i) Carrying out welding or cutting process on metal pipes or other metal objects in contact with walls, barriers, ceilings or combustible objects is not allowed if the work is at close range, to avoid the risk of fire transmission via conducting.

8. **Cutting or welding works must be prevented in the following locations**:

a) In areas where no permit has been issued from the relevant official departments.
b) In the presence of explosive atmospheres such as a mixture of gases, fumes, flammable liquids, dust with air or explosive atmospheres within unclean or poorly equipped tanks or equipment that contained such materials.
c) In nearby warehouses containing quantities of highly flammable materials such as sulfur blocks, paper bales or cotton.
d) The management of the site or facility must assume its responsibility to protect its property when using cutting and welding equipment and must implement the following:
e) To establish dedicated cutting and welding areas away from other areas.
f) Assign a person responsible for authorizing cutting and welding process in areas that are not designed for these types of operations.
g) To train cutting and welding workers and their supervisors in a proper way to ensure operating their equipment in a safe way.
h) The facility management should notify all contractors responsible for carrying out cutting and welding operations within the facility about dangerous areas such as warehouses, gas and fuel connections. Etc. to take the necessary precautions.

Fourth: **using liquefied** (**LPG**) **or industrial gases in cutting and welding process**:

If these types of gases are used in the cutting and welding process, the conditions and safety instructions must be implemented as per the Regulation of Petroleum Gases or Industrial Gases. Gas installations such as cylinders or tanks and connections must be as per SASO standards, and Civil Defense regulations.

Fifth: **Safety measures during welding process of oil tankers and containers**:

During welding process of tankers or any container dedicated to petroleum materials, the following precautions must be implemented in addition to the previous conditions:

1. The tanker or container must be discharged/ emptied from all petroleum liquids and residues/sediments.
2. The tanker or container should be washed thoroughly with hot water and cleaning agents/detergents.
3. Water steam is released inside the tanker or container to ensure all accumulated gasses inside is removed.
4. The tanker or container must be well ventilated.
5. These requirements should be implemented under the supervision of an official or safety inspector.

Sixth: **Protective equipment** (**PPE**) **for workers**:
The following PPE must be provided:

1. Protective helmet made of flame resistance materials and provide the necessary protection against shocks.
2. Protective goggles for the face and eyes, and reflect extreme/intense light and heat.
3. Hand covers (gloves), must be made or covered with protective insulation material.
4. Breathing apparatus and protective masks.
5. Protective shoes (boots) equipped with a piece of metal at the heels, to dissipate any static charge while moving or walking.
6. Protective clothing against hot equipment, easy to wear and take off, made of heat-resistant materials, and does not cause harm to the body, kept clean and sanitized.

PPE must comply with the technical specifications, and workers should be trained on how to use them by specialists, regular maintenance must be carried out for PPE.

Seventh: **Ventilation**
Adequate ventilation (mechanical or natural) must be provided in welding areas to meet safety requirements and prevent accumulation of harmful gases and fumes.

Eighth: **Safety measures for workers**:

1. Careful monitoring according to a specific schedule on the conditions of the working areas and the level of workers exposure to risks or stress.
2. Regular inspection and evaluation must be carried out to ensure the continued programs effectiveness.
3. Workers must not be assigned to perform jobs that require the use of breathing apparatus unless they prove fit to carry out these jobs while using such equipment. The relevant doctor must determine the appropriate health and physical conditions, and the health condition must be re-examined annually for those using breathing apparatus.