

# **SAFEGUIDE**

## **OCCUPATIONAL HEALTH & SAFETY RISK ASSESSMENT GUIDE**

### **APPLICATION EXAMPLE**

## **OCCUPATION: GAS WELDER**

### **PART A. GENERAL FACTS ABOUT THE OCCUPATION**

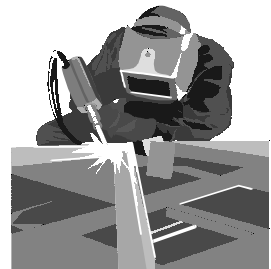
#### **1. THE JOB OF A GAS WELDER**

The gas welder joins or cuts metallic elements such as metal plates, sheets, machine elements or other type of parts by locally rendering the metal liquid with the use of a flame produced from the combustion of oxygen and one of several gases (acetylene, propane, etc).

Common tasks performed by a gas welder include:

- Carrying the parts and the gas welding equipment
- Fixturing of the parts to be welded
- Cleaning the surfaces of the parts to be welded
- Cutting or welding
- Checking the welded parts
- Removing the welded parts and the gas welding equipment.

The equipment used by a gas welder includes: compressed gas cylinders and their subsidiary equipment (torch, hoses, flexible tubes, blowpipes, cylinder pressure gauges, working pressure gauges, back pressure valves, flashback arrestors etc), mechanical aids to assist in moving, lifting and fastening of the parts (cranes, hoists, conveyors, transportation trailers etc).



#### **2. MOST COMMON HAZARDS RELEVANT TO THE JOB OF A GAS WELDER**



- Inhalation of hazardous fumes, such as nitrogen dioxide or metal fumes (depending on the composition of the filler rod and the surface of the welded parts)
- Exposure to radiation
- Burns (due to the flame or the molten metal)
- Fire/ Explosion
- Injuries as a result of falls, crushing or smashing during the transportation, fastening or processing the parts.

#### **3. MOST COMMON WORK RELATED DISEASES AND ILLNESSES RELEVANT TO THE JOB OF A GAS WELDER**

- Respiratory problems due to the inhalation of fumes
- Conjunctivitis / cataract due to radiation exposure.



#### **4. OTHER GROUPS OF WORKERS THAT ARE SUBJECT TO THE HAZARDS RELATED WITH THE JOB OF A GAS WELDER**



Persons working near or passing by the gas welders' workplace are also at risk from the hazards of radiation exposure and fumes inhalation.

Any other person could be in danger from the risk of fire and explosion.



## 5. PREVENTIVE MEASURES IN THE JOB OF A GAS WELDER

### GENERAL PREVENTIVE MEASURES

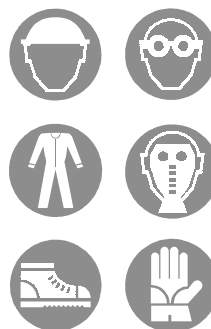
- Gas welding operations should only be performed by personnel having the gas welders' state license (see unit 6).
- The appropriate Personal Protective Equipment should always be used (see unit 7).
- Before welding commences persons working or passing by the workplace should be warned.
- After the welding operation is finished persons working nearby should be warned for hot surfaces in order to avoid the risk of burning.
- The workplace should be kept tidy and obstacle free. Other requirements may include:
  - Local exhaust ventilation equipment and additional lighting where necessary.
  - Suitable fire extinguishing apparatus and appropriately equipped first aid medical kit should be placed in a nearby and easily reachable place.
  - Emergency exits should always be reachable and appropriately signed.
  - Safety signs should be placed where necessary.
- All protective clothing worn in welding operations, as well as the whole workplace, should be free from oil or grease in order to avoid the risk of fire. Cylinders' subsidiary equipment that may contact oxygen should not be lubricated. The use of oxygen for cleaning, compressed air etc. purposes is prohibited.

### COMPRESSED GAS CYLINDERS AND THEIR SUBSIDIARY EQUIPMENT

- The compressed gas cylinders should always be tied in order to avoid fall or hit.
- The compressed gas cylinders should always be stored upright, their cover cups should be screwed and kept away of heat sources. Never in direct sunlight!
- In case of storage in closed spaces, special care should be taken for adequate ventilation, suitable fire extinguishing apparatus and appropriate safety signs.
- Cylinders containing different gases, as well as empty or damaged cylinders should be stored separately.
- The handling and transportation of the compressed gas cylinders should always be done carefully and with the appropriate means (conveyors, transportation trailer etc).
- A large number of compressed gas cylinders should not be stored in the workplace. The compressed gas cylinders should not be stored in spaces that have additional uses.
- Only soapy water should be used for search of gas leaks (never flame).
- Non-return valves and flashback arrestors should be fitted to all flexible pipes.
- Cooper fittings should never be used in acetylene pipes.

## 6. PERSONAL PROTECTIVE EQUIPMENT OF A GAS WELDER

- Apron (leather or other fire resistant material)
- Protective gloves (leather)
- Appropriate goggles or other eye protection (screens etc)
- Protective footwear with isolating sole and leather leggings
- Respirators or other breathing apparatus where necessary
- Ear-muffs in cases of high noise level
- Leather head covering.



Gas welders should avoid clothing made of synthetic materials. Trousers should not have cuffs so as not to trap globules of molten metal. Clothes with oil or grease dirt should also be avoided because of fire hazard.

Some brief guidelines for the selection of the appropriate Personal Protective Equipment are given in APPENDIX 2. In every case of the relevant EN Standards should be taken into account.



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## OCCUPATIONAL HEALTH & SAFETY RISK ASSESSMENT GUIDE

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### PART B. WRITTEN RISK ASSESSMENT



**WORKPLACE:**..... **ASSESSMENT DATE:**.....

1. HAZARDS ASSOCIATED WITH THE RAW MATERIALS USED			
POTENTIAL HAZARDS	LIK.	SEV.	PREVENTIVE/ PROTECTIVE MEASURES
<i>Hazards associated with the raw material supply</i> <ul style="list-style-type: none"> <li>• Injuries as a result of carrying or lifting of the cylinders or the parts to be welded</li> <li>• Explosion due to compressed gas cylinders' fall</li> </ul>			<ul style="list-style-type: none"> <li>• The transportation of the compressed gas cylinders should be made with the appropriate means (conveyor, transportation trailer). Rolling and hand lifting is permitted in small distances only</li> <li>• Use the appropriate PPE (protective gloves and footwear)</li> <li>• The compressed gas cylinders should not be violently hit</li> <li>• Handle all compressed gas cylinders as if they were full</li> </ul>
<i>Hazards associated with the temporary storage of the raw materials used</i> <ul style="list-style-type: none"> <li>• Injuries from the fall of the cylinders or the parts to be welded</li> <li>• Fire and/ or explosion due to compressed gas cylinders' overheat</li> <li>• Fire and / or explosion due to gas leaks</li> </ul>			<ul style="list-style-type: none"> <li>• Cylinders should be tied</li> <li>• Correct rigging of the parts</li> <li>• Use the appropriate PPE (protective footwear)</li> <li>• Cylinders should be stored away from heat sources, flammable or explosive materials and away from the workplace. Never in direct sunlight</li> <li>• Gas leak check</li> <li>• Closed storehouses should be adequately ventilated</li> <li>• Separate storage of cylinders containing different gases and damaged or empty ones</li> <li>• Small numbers of cylinders stored, storage in spaces that have different uses should be avoided</li> </ul>
<i>Other potential hazards associated with the raw materials used</i>			<i>Preventive and protective measures that are proposed</i>

2. HAZARDS ASSOCIATED WITH THE CURRENT PRODUCTION PROCEDURE			
POTENTIAL HAZARDS	LIK.	SEV.	PREVENTIVE/ PROTECTIVE MEASURES
<i>Tools, Machinery, Fixtures etc in use.</i> <ul style="list-style-type: none"> <li>• Fire and or explosion caused by flashback due to wrong placement, malfunction or absence of the flashback arrestors</li> <li>• Fire from the inflammation of organic substances</li> </ul>			<ul style="list-style-type: none"> <li>• The subsidiary equipment of the compressed gas cylinders should be kept in good condition, periodically checked and properly maintained</li> <li>• Appropriate use of the flashback arrestors</li> <li>• Cylinders' subsidiary equipment that may contact oxygen should not be lubricated</li> </ul>
<i>Hazards associated with the work method used</i> <ul style="list-style-type: none"> <li>• Explosion due to reverse flow of oxygen into the acetylene pipe because of blocked nozzle tip</li> <li>• Fire caused by sparks fallen to nearby explosive or flammable materials</li> </ul>			<ul style="list-style-type: none"> <li>• The subsidiary equipment of the compressed gas cylinders should be kept in good condition, periodically checked and properly maintained</li> <li>• Keep the workplace clean from flammable material</li> <li>• Keep confined spaces clean from flammable material and check their level</li> <li>• No greasy cloths or objects allowed on compressed gas cylinders and their subsidiary equipment</li> <li>• No clothing with oil dirt or made of composite material is allowed</li> <li>• Suitable fire extinguishing apparatus should be placed in a nearby and easily reachable place</li> </ul>
<i>Mechanical hazards and ergonomic faults in the workplace</i> <ul style="list-style-type: none"> <li>• Burns caused by sparks or molten metal</li> </ul>			<ul style="list-style-type: none"> <li>• Use the appropriate PPE (leather apron, gloves, leggings)</li> <li>• Appropriately equipped first aid medical kit should be placed in a nearby and easily reachable place</li> </ul>
<i>Other potential hazards associated with the current production procedure</i>			<i>Preventive and protective measures that are proposed</i>

### 3. HAZARDS ASSOCIATED WITH THE WORKING ENVIRONMENT

POTENTIAL HAZARDS	LIK.	SEV.	PREVENTIVE/ PROTECTIVE MEASURES
<i>Physical Hazards</i> <ul style="list-style-type: none"> <li>• Insufficient lighting</li> <li>• Noise</li> <li>• High temperature</li> </ul>			<ul style="list-style-type: none"> <li>• Improve lighting conditions locally</li> <li>• Use ear muffs</li> <li>• Noise screens, noise isolation</li> <li>• Elimination of the heat sources where possible</li> <li>• Natural or artificial ventilation</li> <li>• Air conditioning</li> <li>• Temperature control combined with humidity level</li> </ul>
<i>Chemical Hazards</i> <ul style="list-style-type: none"> <li>• Inhalation of dangerous fumes and gases produced during the moulting of the welded metals, the burning of the paint, grease, debris and the like on the welded parts, the prolonged contact of the flame to the metal</li> </ul>			<ul style="list-style-type: none"> <li>• Use the appropriate PPE (respirator or breathing apparatus)</li> <li>• Sufficient local or general ventilation (working in confined spaces tanks, vessels etc. without special protective measures is prohibited)</li> <li>• Clean the surfaces of the parts to be welded with the appropriate solvents</li> <li>• Chemical analysis of the produced fumes and gases</li> </ul>
<i>Radiation</i> <ul style="list-style-type: none"> <li>• Exposure to radiation</li> </ul>			<ul style="list-style-type: none"> <li>• Protective screens erection</li> <li>• Use the appropriate PPE (suitable goggles with the correct grade of filter)</li> </ul>
<i>Job site</i> <ul style="list-style-type: none"> <li>• Quick fire spread due to flammable construction material, large openings and lack of fire extinguishing apparatus</li> <li>• Injuries during the emptying of the premises in case of emergency</li> </ul>			<ul style="list-style-type: none"> <li>• Suitable fire fighting system</li> <li>• Cover of the openings</li> <li>• Use of fire resistant construction material</li> <li>• Emergency exits should be kept open and easily reached</li> <li>• Appropriate safety signs</li> </ul>
<i>Other potential hazards associated with the working environment</i>			<i>Preventive and protective measures that are proposed</i>

#### 4. HAZARDS ASSOCIATED WITH THE FINAL PRODUCT AND SUBPRODUCTS

POTENTIAL HAZARDS	LIK.	SEV.	PREVENTIVE/ PROTECTIVE MEASURES
<i>Hazards associated with taking away of the final product and subproducts</i> <ul style="list-style-type: none"> <li>• Burns caused by recently welded parts</li> <li>• Injuries as a result of taking away the welded parts</li> </ul>			<ul style="list-style-type: none"> <li>• Warn passers by and persons in close workplaces. Safety signs on recently welded parts</li> <li>• Use the appropriate PPE ( protective gloves and footwear)</li> <li>• The transportation should be done with the appropriate means (fork lift vehicle, conveyor, crane, trailer)</li> </ul>
<i>Hazards associated with the temporary storage of the final product and subproducts</i> <ul style="list-style-type: none"> <li>• Injuries as a result of fall or displacement during the storage of the welded parts</li> </ul>			<ul style="list-style-type: none"> <li>• Use the appropriate PPE ( protective gloves and footwear)</li> <li>• Stack and secure the stored parts safely</li> </ul>
<i>Other potential hazards associated with the final product and subproducts:</i>			<i>Preventive and protective measures that are proposed</i>

#### 5. OTHER TYPES OF HAZARD

POTENTIAL HAZARDS	LIK.	SEV.	PREVENTIVE/ PROTECTIVE MEASURES
<i>Hazards associated with the poor organisation of work</i> <ul style="list-style-type: none"> <li>• Working instructions that are not clear</li> </ul>			<ul style="list-style-type: none"> <li>• Clear and explicit working instructions</li> <li>• Clearly defined tasks and duties</li> </ul>
<i>Hazards associated with psychological factors</i> <ul style="list-style-type: none"> <li>• Time pressure</li> <li>• Poor cooperation with co-workers and supervisors</li> </ul>			<ul style="list-style-type: none"> <li>• Appropriate work schedule</li> <li>• Conditions that promote good cooperation</li> </ul>
<i>Hazards associated with the particular requirements of the work and the particularities of the specific workplace</i>			

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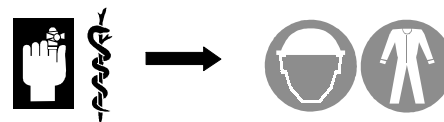
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### PART C. POTENTIAL HAZARDS AND PERSONAL PROTECTIVE EQUIPMENT



PART OF THE BODY AT RISK													
		HEAD					UPPER LIMBS	LOWER LIMBS	GENERAL				
		S C U L L	E A R S	E Y E S	F A C E	R E S P I R A T. T R A C K	H A R M S	A R M S	F E E T	L E G S	S K I N	A B D O M E N	OTHER IDENTIFIED PART OF THE BODY AT RISK
<b>POSSIBLE HAZARDS</b>													
<b>MECHANICAL</b>	FALLS FROM HEIGHTS												
	BURNS – CUTS											X	
	IMPACT – CRUSHING – ENTANGLEMENT						X		X				
	VIBRATION												
	SLIPS												
<b>ELECTRICAL</b>													
<b>THERMAL</b>	HEAT-FLAMES											X	
	COLD												
<b>RADIATION</b>	NON IONISING			X							X		
	IONISING												
<b>NOISE</b>													
<b>CHEMICAL</b>	GASES-VAPOURS												
	FUMES												
	MISTS												
	IMMERSION												
	SPLASHES												
<b>GASES-VAPOURS</b>													
<b>BIOLOGICAL</b>	HARMFUL BACTERIA												
	HARMFUL VIRUS												
	FUNGI												
<b>PROPOSED PERSONAL PROTECTIVE EQUIPMENT</b>		H E L M E T	E A R M U F F S	G O G G L E S	F A C E P R O T.	R E S P I R. D E V.	G L O V E S	P R O T. C L O T H I N G	F O O T W E A R	P R O T. C L O T H I N G	O I N T M E N T S	P R O T. C L O T H I N G	PROTECTIVE CLOTHING, PROTECTIVE EQUIPMENT AGAINST FALLS FROM A HEIGHT ETC
													PROPER PROTECTIVE EQUIPMENT



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#### OCCUPATION: GAS WELDER



#### PART D. LEGISLATION - STANDARDS - REFERENCES

##### 1. RELEVANT GREEK LEGISLATION



1. L. 1568/1985 "Υγιεινή και ασφάλεια των εργαζομένων"
2. D.L. 17/96 "Μέτρα για τη βελτίωση της ασφάλειας και της υγείας των εργαζομένων κατά την εργασία σε συμμόρφωση με τις οδηγίες 89/391/ΕΟΚ και 91/383/ΕΟΚ"
3. D.L. 16/96 "Ελάχιστες προδιαγραφές ασφάλειας και υγείας στους χώρους εργασίας σε συμμόρφωση με την οδηγία 89/645/ΕΟΚ"
4. D.L. 395/1994 "Ελάχιστες προδιαγραφές ασφάλειας και υγείας για τη χρήση από τους εργαζόμενους εξοπλισμού ατομικής προστασίας κατά την εργασία σε συμμόρφωση προς την οδηγία του Συμβουλίου 89/656/ΕΟΚ"
5. D.L. 105/1995 "Ελάχιστες προδιαγραφές για την σήμανση ασφάλειας ή/ και υγείας στην εργασία σε συμμόρφωση με την οδηγία 92/58/ΕΟΚ"
6. D.L. 95/1978 "Περί μέτρων υγιεινής και ασφαλείας των απασχολουμένων εις εργασίας συγκολλήσεων"
7. D.L. 159/1999 "Τροποποίηση του προεδρικού διατάγματος 17/96 "Μέτρα για τη βελτίωση της ασφάλειας και της υγείας των εργαζομένων κατά την εργασία, σε συμμόρφωση με τις οδηγίες 89/391/ΕΟΚ και 91/383/ΕΟΚ"

For more information and a further relevant investigation the following web site is proposed:  
[www.elinyae.gr](http://www.elinyae.gr)

##### 2. EUROPEAN EN STANDARDS RELEVANT TO THE PROPOSED PERSONAL PROTECTIVE EQUIPMENT (P.P.E.)



EN 420	General requirements for gloves
EN 470-1	Protective clothing used in welding and allied processes
EN 407	Protective gloves against thermal risks
ENV 340	Protective clothing: General Requirements
prEN 12477:1996	Protective gloves for welders
EN 169-93	Personal eye protection – Filters for welding and related techniques – Transmittance requirements and recommended utilisation.
EN 170-93	Personal eye protection – Ultraviolet filters – Transmittance requirements and recommended use.
EN 171-93	Personal eye protection – Infrared filters – Transmittance requirements and recommended use.
EN 175-97	Personal protection – Equipment for eye and face protection during welding and allied processes
EN 379 –95	Industrial safety helmets
EN 812-99	Industrial bump caps
EN 345 –95	Specification for safety footwear for professional use
EN 346-93	Specification for safety footwear for professional use

For more information and a further relevant investigation the following web sites are proposed:  
[www.elot.gr](http://www.elot.gr), [www.idec.gr/ppe](http://www.idec.gr/ppe), [www.cenorm.be](http://www.cenorm.be) .

### 3. SPECIALISED BIBLIOGRAPHICAL REFERENCES



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- Επιδημιολογία και πρόληψη επαγγελματικών νόσων, Α. Λίνου, Αθήνα 1989
- Βιομηχανικά Αέρια σε φιάλες – Μέτρα Ασφάλειας κατά τη χρήση τους, Σ. Δοντάς, ΕΛΙΝΥΑΕ, Αθήνα 1999
- “ΥΓΕΙΑ ΚΑΙ ΑΣΦΑΛΕΙΑ ΣΤΗΝ ΕΡΓΑΣΙΑ” Αθήνα 1987.Άρθρο “ΗΛΕΚΤΡΟΚΟΛΛΗΣΕΙΣ-ΟΞΥΓΟΝΟΚΟΛΛΗΣΕΙΣ”, Σωτηρης Ασλάνης Χημικός Τεχν. Επιθεωρητής Υπ. Εργασίας
- BS 8800 : 1996 “Occupational health and safety management systems”
- Croner's Risk Assessment, Croner Publications Ltd., Surrey 1995
- Handbook of Occupational Safety and Health, pp. 85-98, 2<sup>nd</sup> edition, 1999 John Wiley and Sons
- Encyclopaedia of Occupational Health and Safety, ILO
- “Guidance on risk assessment at work”, European Commission, Directorate-General V Employment, Industrial relations and social affairs.