OCCUPATIONAL HEALTH & SAFETY
AT INDUSTRIAL WORK PLACES

F O R E W O R D

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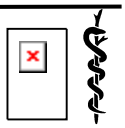
1. INTRODUCTION



1.1 INTRODUCTION TO THE BASIC CONCEPTS OF OCCUPATIONAL HEALTH AND SAFETY

The reassurance of the health and the safety of the manpower in a working environment is a critical issue and a major responsibility. Stakeholders in this responsibility are:

- the state, for providing the necessary legislation framework and for the proper operation of the competent control authorities
- the employers, for keeping their obligations according to the relevant legislation
- the employees themselves, for being able to anticipate the criticality and delicacy of the issue and to respond with the necessary sensitivity.

According to the labour legislation, the term *labour accident* is defined as an external violent event giving rise to work incapability, whereas the term *work-related disease* as the ill-health that is judged to have been caused by or made worse by a person's work activity or environment.

The issue of occupational health and safety has a strong impact in:

- the employee himself
- the company/ firm/ enterprise
- the state
- the society in general.

To cope effectively with such a problem it is clear that a strong effort is needed from all the engaged parts:

- The employees
- The occupational health and safety personnel
- The production responsible staff
- The employers
- The designers and work planning engineers
- The state and its competent authorities.

Furthermore the efficient labour accident and work related disease control management is considered to be based on:

- the knowledge and the estimations of the experts, meaning the work of the Safety Engineer and the Labour Doctor

- the obligation and the sensitivity of the employer
- the awareness and the participation of the employees and their representatives (Union Trades, Occupational Health and Safety Committees)

At this point it is necessary to stress that the role of the Syndicalistic Movement in the protection of the employees' fundamental rights for proper working conditions and safe working environment is of great importance. Experience shows that the best results are achieved with the consulting support of the experts, meaning the Safety Engineer and the Labour Doctor, in combination with the efficient communication and consultation with the employees. From such a controversy and co-operation the employer is orientated to the most efficient risk control policy.

Based on a strong belief that all kinds of problems should be identified, examined and evaluated in such a way that their solution is correctly planned, we worked on the edition of the **"Occupational Health & Safety Risk Assessment Guide"**. Nevertheless, we consider it necessary to stress the fact that for the assessment and especially the evaluation of the risks in a working environment not only a significant amount of expert knowledge is required, but also a considerable relevant experience. Fortunately or not, it is not a task to be successfully accomplished by everyone, be it an inexperienced worker or even an engineer, or a physician who does not have some relevant experience. On the other hand, it is true that in a very high percentage the employees, especially in our country, are inadequately informed about the issues of occupational health and safety and are ignorant of both the relevant legislation and the preventive measures.

Thus, the edition of this **"Occupational Health & Safety Risk Assessment Guide"** comes as a contribution to the spreading and understanding of the basic occupational health and safety concepts from all the engaged in the working environment parts and mainly as an aid to the employees and their union trades in order to be able to assess the risks in their own workplaces and to claim for their right to proper working conditions.

Furthermore, this guide may be also a useful tool to Small Medium Enterprises' owners, handicraftsmen and even to production engineers, who in many cases have to do the job of a safety engineer without having any prior relevant experience.

1.2 LEGISLATIVE FRAMEWORK

In 1989 the Council Directive 89/391/EEC *"on the implementation of measures to promote the improvement of the workers' safety and health on the workplace"*, also referred as General Directive, was issued aiming at the better protection of the workers and at equal conditions among the member states of the EU.

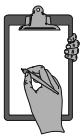
The main characteristic of the above Directive is that it states the general principles on which all the national legislation relevant to occupational health and safety of the member states should be based on. These principles concern the promotion of health and safety issues (work – related diseases prevention, elimination of the potential hazards) and also the statutory framework and procedures (rending aware, discuss, active participation of the employees, instruction and training).

In Greece the harmonisation with the General Directive was done with the decree law 17/96, which enhanced the regulations already introduced in both law 1568/85 and decree law 294/88 implementing at the same time the new requirements of the above Directive.

Among the new requirements there is the employers' obligation of having *a written risk assessment of all the existing hazards that concern the occupational health and safety of his employees.*

The above assessment is mainly aiming at the identification and prioritisation of the potential hazards in order to correctly plan the necessary actions that could reassure the health and safety of all the employees and of everyone else affected in any way from the operational activities of the company/ firm/ enterprise.

Risk assessment is an internal procedure. It is performed by the Safety Engineer, the Labour Doctor, the Internal Division of Protection and Prevention or the External Division of Protection and Prevention, to whom the employer is providing every needed help in material or personnel. During the assessment procedure the participation of the employees and their representatives is required, as well as their informing after the completion of the assessment on the risk control policy and the implementation plan of the necessary considered preventive measures.



1.3 THE RISK ASSESSMENT PROCESS

Risk assessment is the systematical analysis of every aspect of all the tasks performed in the workplace in order to identify:

- what could cause loss or damage
- in which extend could the potential hazards be eliminated
- the protective and preventive measures already in use and those that are necessary to implement for the adequate control of the residual risks

It is important to make a clear distinction between the concepts that are expressed with the terms ***Hazard*** and ***Risk***:

Hazard: A source or a situation that under certain circumstances has a potential for harm.

Risk: The combination of the likelihood and consequence of a specified hazardous event occurring (human injury or ill health, damage to property, damage to the environment or a combination of these).

There are no strict rules for the risk assessment process. However, in all the known methodologies the following general steps are suggested:

1. Identify the potential hazards
2. Identify those who may be exposed to these hazards
3. Evaluate or estimate the risk
4. Identify and evaluate the risk control measures that are already in use and consider and implement additional risk control measures
5. Monitor the measures/ Review and feedback corrective actions.

1.3.1 IDENTIFY THE POTENTIAL HAZARDS

In order to identify the potential hazards, the working environment inspection is necessary in order to record and analyse the different tasks and work phases. There are several approaches for the examination and separation of the potential hazards, such as:

- **By type:**
  - Physical Hazards (noise, insufficient or improper light, high or low temperatures, vibrations, radiation, etc)
  - Chemical Hazards (hazardous substances)
  - Biological Hazards (viruses, fungi, bacteria etc).
- **By source:**
  - Hazards associated with materials or equipment (hazardous raw material, subproducts or final products, improper equipment, improper job site, inadequate maintenance of the machinery and equipment, improper design etc)

- Hazards associated with the working environment (physical, chemical, biological, non-ergonomic design, psychological factors, bad organisation of work etc)
- Hazards associated with human factors (ignorance, negligence, avoidance or wrong actions etc).

- **By production phase:**
  E.g. hazards associated with the preparation, production, transportation, storage, delivery of a product
- **By job site:**
  E.g. hazards identified in the offices, the warehouses, the main production/secondary processing departments etc

1.3.2 IDENTIFY THOSE WHO ARE EXPOSED TO THESE HAZARDS

For the identification of the personnel who might be exposed to the identified hazards, first it is necessary to define the groups of workers that are engaged in the same tasks (e.g. operators, maintain personnel, office employees etc) and then the individuals among them that are considered to be more vulnerable, the very young and the very old aged ones, women in pregnancy, apprentices, workers with health problems etc.

1.3.3 EVALUATE OR ESTIMATE THE RISK

Qualitative or quantitative methods can be applied for the risk assessment, depending on the type of operational activity. In most cases qualitative methods are used that either rank risk as Low – Medium – High or estimate it with a simple mathematical formula, e.g.:

Risk = Lik. x Sev.,

Where Lik.: likelihood of occurrence
Sev.: severity of the harm

The different grades of likelihood and severity or their combination in such methods are given in tables.

Quantitative methods (e.g. Fault Tree Analysis) are using numerical data relevant to the equipment, environment and human factor “failure” cases, these methods and are more commonly used in industries with large scale accidents. Statistical data and information from databases are also frequently required in such methods.

During the risk evaluation step, the existing preventive and protective measures are identified and evaluated. If these measures eliminate or reduce the risks to an acceptable level and they satisfy the legislative requirements, the relevant standards, the internationally accepted “good practice” and – last but not least - they are also known and applied by the employees, then the risks are considered adequately controlled. If this is not the case, new or additional preventive and protective measures should be implemented. After a significant amount of time, feedback should be taken from the implementation of these new measures in practice for the necessary monitoring and reviewing to be done.

Additionally, cases of employees’ permanent exposure in particular hazard (e.g. high level of noise, hazardous chemical substance etc) should be treated with special care. Depending to their level, several such hazards may cause serious occupational diseases and illnesses. In such cases the active involvement of the Labour Doctor is considered necessary for the risk assessment to be complete, as well as the following actions:

- Measurements of the level of the hazards and the hazardous substances
- Statistical analysis
- Frequent medical examinations.

1.3.4 IDENTIFY AND EVALUATE THE RISK CONTROL MEASURES THAT ARE ALREADY IN USE – CONSIDER AND IMPLEMENT ADDITIONAL SUCH MEASURES

The ultimate goal of the whole risk assessment process is to propose and establish an efficient system of safety management. The general principles towards this direction, as indicated in decree law 17/96 legislation framework are the following:

i. Risk elimination
ii. Evaluation of the risks that cannot be eliminated
iii. Tasks fit to human
iv. Replacement of the hazardous with the non hazardous or the less hazardous
v. Prevention planning based on relevant technology, organisation of the work, working conditions and environment, employers-employees good relationship
vi. Risk control in its source
vii. Collective preventive measures taken in priority over personal protective measures
viii. Implementation of the latest technological upgrades
ix. Provide all the necessary instructions to the personnel

According to the above, the proposed risk control measures should have an hierarchical order such as:

1. Risk elimination
2. Risk isolation
3. Send away the employee from the potential hazard source
4. Risk reduction by the use of collective preventive measures
5. Personal Protective Equipment, Safety signs, personnel training on occupational health and safety issues.

1.3.5 MONITOR THE MEASURES/ REVIEW AND FEEDBACK CORRECTIVE ACTIONS

Risk assessment is not a procedure that is done once and for all. The assessed facts have to be reviewed and re-examined in order to be completed or modified, especially in cases when:

- Raw materials, equipment or work methods have been changed
- New risks are created from the implementation of the new risk control measures or existing risks that are still there despite the above implementation
- New evidence (such as new regulations, EU directives, standards or technological innovations) that may help towards the enhancement of the existing risk control measures.

2. PRESENTATION OF THE "OCCUPATIONAL HEALTH & SAFETY RISK ASSESSMENT GUIDE"

2.1 INTRODUCTION

The general model on which this **"Occupational Health & Safety Risk Assessment Guide"** is based on appears in Fig. 1.

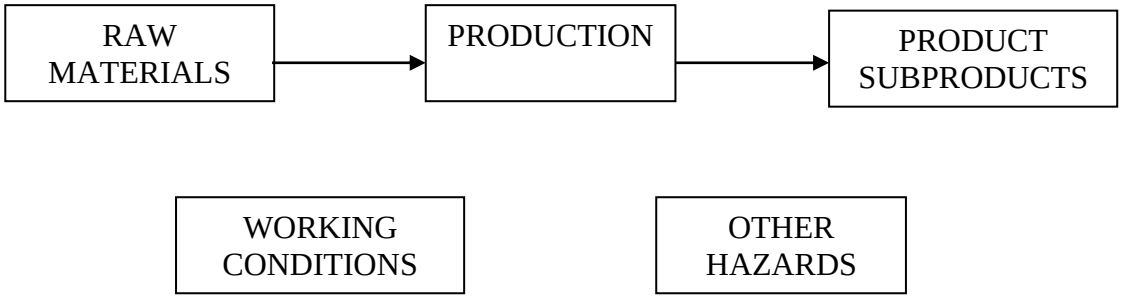


Fig.1 GENERAL MODEL FOR THE RISK IDENTIFICATION IN A WORKPLACE

According to the above model, the identification and recording of the potential hazards in a particular workplace is done by following the next steps:

1. HAZARDS ASSOCIATED WITH THE RAW MATERIALS USED
- 1.1 Hazards associated with the raw material supply
- 1.2 Hazards associated with the temporary storage of the raw materials used.

2. HAZARDS ASSOCIATED WITH THE CURRENT PRODUCTION PROCEDURE
- 2.1 Tools, machinery, fixtures and equipment in use
- 2.2 Method of work
- 2.3 Repair and maintenance

2.4 Mechanical hazards and ergonomic faults in the workplace.

3. HAZARDS ASSOCIATED WITH THE WORKING ENVIRONMENT

3.1 Physical, Chemical and Biological Hazards

3.2 Job site.

4. HAZARDS ASSOCIATED WITH THE FINAL PRODUCT AND SUBPRODUCTS

4.1 Hazards associated with the taking away of the final product and subproducts

4.2 Hazards associated with the temporary storage of the final product and subproducts.

5. OTHER TYPES OF HAZARD

5.1 Hazards associated with the organisation of work

5.2 Psychological factors, stress etc

5.3 Hazards associated with the particular requirements of the work and the particularities of the specific workplace.

For the estimation of each one of the identified risks the following Likelihood / Severity table is provided.

LIKELIHOOD	SEVERITY
0: zero probability	**0**: no effect
1: very unlikely event	**1:** Insignificant effect (e.g. only nuisance)
2: can happen in emergency situations	**2**: may lead, when unprotected, to small injuries which require treatment
3: can happen in normal circumstances	**3**: may lead, when unprotected, to injuries with temporary incapacity
4: frequent exposure	**4**: may lead, when unprotected, to irreversible damage of health or permanent injury
5: permanent exposure	**5**: may cause death, when unprotected

The **"Occupational Health & Safety Risk Assessment Guide"** is separated in four different parts. Each one of these parts has a well-defined role and it concerns a different step of the risk assessment procedure.

Part A. GENERAL FACTS ABOUT THE OCCUPATION is filled with the following:

- General description of the occupation.
- Typical/ common hazards relevant to the occupation.
- Occupations most common work related diseases and illnesses.
- Identification of the personnel that are subject to the risks relevant to the occupation.
- Legislative requirements.
- Personal Protective Equipment commonly used or considered necessary.
- General preventive measures commonly taken or considered necessary in the work of the occupation in question.
- Description of the specific workplace.

Part B. WRITTEN RISK ASSESSMENT is filled with the following:

- Identification, Recording, Analysis and Evaluation of the risks (considering the existing conditions of the specific workplace, e.g. noise or light level data etc).
- Existing and proposed risk control measures.

In cases of employees permanent or frequent exposure in a particular hazard such as high level of noise, hazardous chemical, biological or other type of substance, the following additional actions are considered necessary:

- Medical examinations and statistical analysis
- Measurements of the level of the hazards and the hazardous substances.

Part C. POTENTIAL HAZARDS AND PERSONAL PROTECTIVE EQUIPMENT is a form where hazards are directly associated with parts of the body in order to choose the appropriate Personal Protective Equipment, according to the requirements of the relevant legislation.

Part D. LEGISLATION – STANDARDS - REFERENCES is filled with the following:

- Relevant Greek legislation.
- European EN Standards relevant to the proposed Personal Protective Equipment.
- Specialized Bibliographical References.

In the following pages a Model of the guide is given, with the relevant filling instructions, and four Application Examples for the occupations of:

- gas welder
- electric welder
- machine tool operator
- fitter.

2.2 THE "OCCUPATIONAL HEALTH & SAFETY RISK ASSESSMENT GUIDE" AND ITS USE

GENERAL FACTS

The Occupational Health & Safety Risk Assessment Guide (**SAFEGUIDE**) is a tool for the systematic recording of the working conditions and the potential hazards in the working environment. Having as its main target the most efficient application of the relevant legislation, the Guide is separated in 4 different parts:

A. GENERAL FACTS ABOUT THE OCCUPATION
B. WRITTEN RISK ASSESSMENT
C. POTENTIAL HAZARDS AND PERSONAL PROTECTIVE EQUIPMENT
D. LEGISLATION – STANDARDS – REFERENCES.

GUIDELINES ON HOW TO FILL THE DIFFERENT PARTS

1. **Part A** is to be filled with information such as: common hazards, main preventive measures and Personal Protective Equipment in use. Do not hesitate to write some of them or to add others that appear to be necessary. The description of your particular workplace is a task that only you can do it correctly.

2. In **Part B** potential hazards are divided in the five following categories**:**
   - Hazards associated with the raw materials used
   - Hazards associated with the current production procedure
   - Hazards associated with the working environment
   - Hazards associated with the final product and subproducts
   - Other types of hazard (e.g. organisation of work).

3. In case you identify some hazard not mentioned in the form, fill it in the relevant category field or in the “Other types of Hazards” category fields and indicate near by the proposed relevant preventive

and protective measures. An extensive catalogue with the common hazards met in an industrial working environment is provided in APPENDIX 1.

4. Evaluate the likelihood of occurrence and the severity of the harm for each hazard according to the graduation proposed in the following table:

LIKELIHOOD	SEVERITY
0: zero probability	**0**: no effect
1: very unlikely event	**1:** Insignificant effect (e.g. only nuisance)
2: can happen in emergency situations	**2**: may lead, when unprotected, to small injuries which require treatment
3: can happen in normal circumstances	**3**: may lead, when unprotected, to injuries with temporary incapacity
4: frequent exposure	**4**: may lead, when unprotected, to irreversible damage of health or permanent injury
5: permanent exposure	**5**: may cause death, when unprotected

IMPORTANT: BE CAREFUL IN THE EVALUATION OF THE RISKS. For instance, a simple nuisance for a worker on a scaffold is not evaluated as severity level 1 risk, but as severity level 5. In any case the proposed "quantitative" evaluation of the risk is indicative. Its main purpose is to stress the urgency of the situation and the direct need for protective measures.

5. In **Part C** the provided form directly relates the potential hazards with parts of the body in order to indicate the appropriate Personal Protective Equipment. To fill it correctly, it is necessary to consider the existing risks in the specific workplace as identified and recorded in Part B. At the left part of the form there is a list of all the possible types of hazard. For each one of them identified in your workplace check the relevant field considering the part of your body, which is in danger i. e. looking at the upper part of the form. In the lower part of the form the appropriate type of Personal Protective Equipment is directly indicated The exact type of the indicated PPE should be finally determined considering the relevant EN Standards that are available in Part D of the Guide.
In APPENDIX 2 a brief presentation of the correct way for PPE assignment can be found.

REMARKS

1. If there is any doubt do not hesitate to contact OVES, your union trade, the health and safety committee, the safety engineer, the labour doctor, or the state competent authorities.

2. In case you identify risks that may cause occupational diseases and illnesses (e.g. due to chemical, or other type of hazardous substances), it is considered necessary to measure the level of the risk (e.g. noise level in decibels, concentration of a chemical substance etc) and to go through frequent medical examinations. In such cases the active involvement of the labour doctor is extremely important.

3. Do not forget that the assessment done with this guide should reflect the real image of your workplace, namely:
   a. The existing risks for your health and safety with the relevant measurements (considering of course that they are available, but in any case do not underestimate the fact that most of times you are able to anticipate weather the conditions in your workplace are proper or not, e.g. inadequate light, high noise level, stressing working conditions etc)
   b. In which extend and by what means could the potential hazards be eliminated or reduced to an acceptable level
   c. The protective measures already in use
   d. The additional protective measures that had to be taken for your health and safety.

4. The WRITTEN OCCUPATIONAL RISK ASSESSMENT is a statutory obligation of the employer under the regulations of the D.L. 17/96 and the D.L. 159/99 that modifies the D.L. 17/96.

5. The employer is responsible to put the WRITTEN OCCUPATIONAL RISK ASSESSMENT at the disposal of the workers' representatives.

6. Photocopy the relevant to your occupation Part Band and fill in the data of your personal risk assessment focusing to the hazards that exist in your own workplace.

SAFEGUIDE OCCUPATIONAL HEALTH & SAFETY RISK ASSESSMENT GUIDE

MODEL

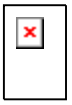
OCCUPATION: ……..

PART A. GENERAL FACTS ABOUT THE OCCUPATION

1. THE JOB OF AN OCCUPATION

- GENERAL DESCRIPTION
- SPECIFIC TASKS
- EQUIPMENT USED

2. MOST COMMON HAZARDS RELEVANT TO THE JOB OF AN OCCUPATION

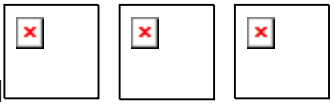


3. MOST COMMON WORK RELATED DISEASES AND ILLNESSES RELEVANT TO THE JOB OF AN OCCUPATION

4. OTHER GROUPS OF WORKERS THAT ARE SUBJECT TO THE HAZARDS RELATED WITH THE JOB OF AN OCCUPATION

5. PREVENTIVE MEASURES IN THE JOB OF AN OCCUPATION

6. PERSONAL PROTECTIVE EQUIPEMENT OF AN OCCUPATION



7. LEGISLATIVE REQUIREMENTS IN THE JOB OF AN OCCUPATION

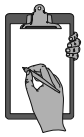
8. NOTES AND REMARKS

9. DESCRIPTION OF THE PARTICULAR WORKPLACE

SAFEGUIDE
OCCUPATIONAL HEALTH & SAFETY RISK ASSESSMENT GUIDE

MODEL

OCCUPATION : ……..



PART B. WRITTEN RISK ASSESSMENT

WORKPLACE LOCATION:…… ASSESSMENT DATE:……..

1. HAZARDS ASSOCIATED WITH THE RAW MATERIALS USED			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Hazards associated with the raw material supply ……			
Hazards associated with the temporary storage of the raw materials used ……			
Other potential hazards associated with the raw materials used ……			*Preventive and protective measures that are proposed* ……

2. HAZARDS ASSOCIATED WITH THE CURRENT PRODUCTION PROCEDURE			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Tools, Machinery, Fixtures etc in use. ……			
Hazards associated with the work method used ……			
Hazards associated with repair and maintenance works ……			
Mechanical hazards and ergonomic faults in the workplace ……			
Other potential hazards associated with the current production procedure ……			*Preventive and protective measures that are proposed* ……

3. HAZARDS ASSOCIATED WITH THE WORKING ENVIRONMENT			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Physical Hazards *(Noise, Vibration, Temperature, Light, Ventilation, etc.)* *……*			
Chemical Hazards *(Dusts. Particles, Mists, Vapours, Fumes, Splashes etc)* *……*			
Biological Hazards *(Fungi, Harmful bacteria etc)* *……*			
Radiation *(Ionising, Infra red etc)* *……*			
Electricity *……*			
Job site *(Emergency exits, lanes, warning signs, fire prevention means etc.)* *……*			
Other potential hazards associated with the working environment *……*			*Preventive and protective measures that are proposed* *……*

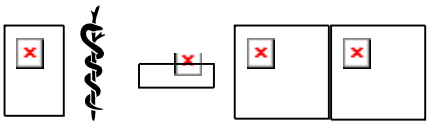
4. HAZARDS ASSOCIATED WITH THE FINAL PRODUCT AND SUBPRODUCTS			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Hazards associated with the taking away of the final product and subproducts *……*			
Hazards associated with the temporary storage of the final product and subproducts *……*			
Other potential hazards associated with the final product and subproducts *……*			*Preventive and protective measures that are proposed* *……*

5. OTHER TYPES OF HAZARD			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Hazards associated with the poor organisation of work *……*			
Hazards associated with psychological factors *……*			
Hazards associated with the particular requirements of the work and the particularities of the specific workplace *……*			

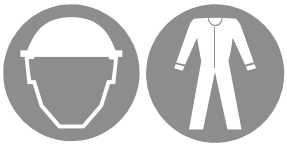
SAFEGUIDE
OCCUPATIONAL HEALTH & SAFETY RISK ASSESSMENT GUIDE

MODEL

OCCUPATION: ……..



PART C. POTENTIAL HAZARDS AND PERSONAL PROTECTIVE EQUIPMENT

		PART OF THE BODY AT RISK												
		HEAD					UPPER LIMBS		LOWER LIMBS		GENERAL			
		SCULL	EARS	EYES	FACE	RESPIRAT. TRACK	HANDS	ARMS	FEET	LEGS	SKIN	ABDOMEN	WHOLE BODY	OTHER IDENTIFIED PART OF THE BODY AT RISK
POSSIBLE HAZARDS														
MECHANICAL	FALLS FROM HEIGHTS													
	BURNS – CUTS													
	IMPACT – CRUSHING – ENTANGLEMENT													
	VIBRATION													
	SLIPS													
ELECTRICAL														
THERMAL	HEAT-FLAMES													
	COLD													
RADIATION	NON IONISING													
	IONISING													
NOISE														
CHEMICAL	GASES-VAPOURS													
	FUMES													
	MISTS													
	IMMERSION													
	SPLASHES													
GASES-VAPOURS														
BIOLOGICAL	HARMFUL BACTERIA													
	HARMFUL VIRUS													
	FUNGI													
PROPOSED PERSONAL PROTECTIVE EQUIPMENT 		HELMET	EAR MUFFS	GOGGLES	FACEPROT.	RESPIR. DEV.	GLOVES	PROT. CLOTHING	FOOTWEAR	PROT. CLOTHING	OINTMENTS	PROT. CLOTHING	PROTECTIVE CLOTHING, PROTECTIVE EQUIPMENT AGAINST FALLS FROM A HEIGHT ETC	PROPER PROTECTIVE EQUIPMENT

MODEL

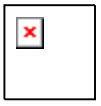
OCCUPATION: ……..

PART D. LEGISLATION - STANDARDS - REFERENCES

1. RELEVENT GREEK LEGISLATION

For more information and a further relevant investigation the web site is proposed: www.elinyae.gr

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



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

3. SPECIALISED BIBLIOGRAPHICAL REFERENCES

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

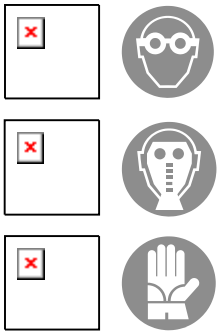
GENERAL PREVENTIVE MEASURES

- 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.

7. LEGISLATIVE REQUIREMENTS IN THE JOB OF A GAS WELDER

A state licence is needed for a worker to do the job of gas welder.

8. NOTES AND REMARKS

For welding or cutting operations in confined spaces (tanks, boilers etc) or in vessels that contained flammable material, special preventive measures should be taken and they should always be supervised by the competent work managers.
In case of welding processes with special safety requirements a more detailed risk assessment procedure should be applied.

9. DESCRIPTION OF THE PARTICULAR WORKPLACE

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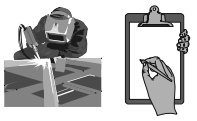
APPLICATION EXAMPLE

OCCUPATION: GAS WELDER



PART B. WRITTEN RISK ASSESSMENT

WORKPLACE:…… ASSESSMENT DATE:……..

1. HAZARDS ASSOCIATED WITH THE RAW MATERIALS USED			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Hazards associated with the raw material supply • Injuries as a result of carrying or lifting of the cylinders or the parts to be welded • Explosion due to compressed gas cylinders' fall ……			 • 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 • Use the appropriate PPE (protective gloves and footwear) • The compressed gas cylinders should not be violently hit • Handle all compressed gas cylinders as if they were full ……
Hazards associated with the temporary storage of the raw materials used • Injuries from the fall of the cylinders or the parts to be welded • Fire and/ or explosion due to compressed gas cylinders' overheat • Fire and / or explosion due to gas leaks ……			 • Cylinders should be tied • Correct rigging of the parts • Use the appropriate PPE (protective footwear) • Cylinders should be stored away from heat sources, flammable or explosive materials and away from the workplace. Never in direct sunlight • Gas leak check • Closed storehouses should be adequately ventilated • Separate storage of cylinders containing different gases and damaged or empty ones • Small numbers of cylinders stored, storage in spaces that have different uses should be avoided ……
Other potential hazards associated with the raw materials used …… …… ……			*Preventive and protective measures that are proposed* …… …… ……

2. HAZARDS ASSOCIATED WITH THE CURRENT PRODUCTION PROCEDURE			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Tools, Machinery, Fixtures etc in use. • Fire and or explosion caused by flashback due to wrong placement, malfunction or absence of the flashback arrestors • Fire from the inflamation of organic substances …… ……			• The subsidiary equipment of the compressed gas cylinders should be kept in good condition, periodically checked and properly maintained • Appropriate use of the flashback arrestors • Cylinders' subsidiary equipment that may contact oxygen should not be lubricated …… ……
Hazards associated with the work method used • Explosion due to reverse flow of oxygen into the acetylene pipe because of blocked nozzle tip • Fire caused by sparks fallen to nearby explosive or flammable materials …… ……			• The subsidiary equipment of the compressed gas cylinders should be kept in good condition, periodically checked and properly maintained • Keep the workplace clean from flammable material • Keep confined spaces clean from flammable material and check their level • No greasy cloths or objects allowed on compressed gas cylinders and their subsidiary equipment • No clothing with oil dirt or made of composite material is allowed • Suitable fire extinguishing apparatus should be placed in a nearby and easily reachable place …… ……
Mechanical hazards and ergonomic faults in the workplace • Burns caused by sparks or molten metal …… ……			• Use the appropriate PPE (leather apron, gloves, leggings) • Appropriately equipped first aid medical kit should be placed in a nearby and easily reachable place …… ……
Other potential hazards associated with the current production procedure …… …… …… …… …… …… …… …… ……			*Preventive and protective measures that are proposed* …… …… …… …… …… …… …… …… ……

3. HAZARDS ASSOCIATED WITH THE WORKING ENVIRONMENT			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Physical Hazards • Insufficient lighting • Noise • High temperature …… ……			 • Improve lighting conditions locally • Use ear muffs • Noise screens, noise isolation • Elimination of the heat sources where possible • Natural or artificial ventilation • Air conditioning • Temperature control combined with humidity level …… ……
Chemical Hazards • 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 …… ……			 • Use the appropriate PPE (respirator or breathing apparatus) • Sufficient local or general ventilation (working in confined spaces tanks, vessels etc. without special protective measures is prohibited) • Clean the surfaces of the parts to be welded with the appropriate solvents • Chemical analysis of the produced fumes and gases …… ……
Radiation • Exposure to radiation …… ……			 • Protective screens erection • Use the appropriate PPE (suitable goggles with the correct grade of filter) …… ……
Job site • Quick fire spread due to flammable construction material, large openings and lack of fire extinguishing apparatus • Injuries during the emptying of the premises in case of emergency ……			 • Suitable fire fighting system • Cover of the openings • Use of fire resistant construction material • Emergency exits should be kept open and easily reached • Appropriate safety signs …… ……
Other potential hazards associated with the working environment …… …… …… ……			*Preventive and protective measures that are proposed* …… …… …… ……

4. HAZARDS ASSOCIATED WITH THE FINAL PRODUCT AND SUBPRODUCTS			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Hazards associated with taking away of the final product and subproducts • Burns cased by recently welded parts • Injuries as a result of taking away the welded parts ……			• Warn passers by and persons in close workplaces. Safety signs on recently welded parts • Use the appropriate PPE (protective gloves and footwear) • The transportation should be done with the appropriate means (fork lift vehicle, conveyor, crane, trailer) ……
Hazards associated with the temporary storage of the final product and subproducts • Injuries as a result of fall or displacement during the storage of the welded parts ……			• Use the appropriate PPE (protective gloves and footwear) • Stack and secure the stored parts safely ……
Other potential hazards associated with the final product and subproducts: …… …… …… …… ……			*Preventive and protective measures that are proposed* …… …… …… …… ……

5. OTHER TYPES OF HAZARD			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Hazards associated with the poor organisation of work • Working instructions that are not clear ……			• Clear and explicit working instructions • Clearly defined tasks and duties ……
Hazards associated with psychological factors • Time pressure • Poor cooperation with co-workers and supervisors ……			• Appropriate work schedule • Conditions that promote good cooperation ……
Hazards associated with the particular requirements of the work and the particularities of the specific workplace …… …… …… ……			

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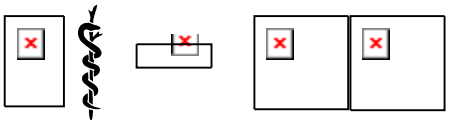
APPLICATION EXAMPLE

OCCUPATION: GAS WELDER

PART C. POTENTIAL HAZARDS AND PERSONAL PROTECTIVE EQUIPMENT



		PART OF THE BODY AT RISK												
		HEAD					UPPER LIMBS		LOWER LIMBS		GENERAL			
		SCULL	EARS	EYES	FACE	RESPIRAT. TRACK	HANDS	ARMS	FEET	LEGS	SKIN	ABDOMEN	WHOLE BODY	OTHER IDENTIFIED PART OF THE BODY AT RISK
POSSIBLE HAZARDS														
MECHANICAL	FALLS FROM HEIGTS													
	BURNS – CUTS												X	
	IMPACT – CRUSHING – ENTANGLEMENT						X		X					
	VIBRATION													
	SLIPS													
ELECTRICAL														
THERMAL	HEAT-FLAMES												X	
	COLD													
RADIATION	NON IONISING			X							X			
	IONISING													
NOISE														
CHEMICAL	GASES-VAPOURS													
	FUMES													
	MISTS													
	IMMERSION													
	SPLASHES													
GASES-VAPOURS						X								
BIOLOGICAL	HARMFUL BACTERIA													
	HARMFUL VIRUS													
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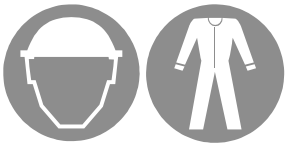
PROPOSED PERSONAL PROTECTIVE EQUIPMENT 		HELMET	EAR MUFFS	GOGGLES	FACE PROT.	RESPIR. DEV.	GLOVES	PROT. CLOTHING	FOOTWEAR	PROT. CLOTHING	OINTMENTS	PROT. CLOTHING	PROTECTIVE CLOTHING, PROTECTIVE EQUIPMENT AGAINST FALLS FROM A HEIGHT ETC	PROPER PROTECTIVE EQUIPMENT

APPLICATION EXAMPLE

OCCUPATION: GAS WELDER

PART D. LEGISLATION - STANDARDS - REFERENCES

1. RELEVENT 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

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, www.idec.gr/ppe, www.cenorm.be .

3. SPECIALISED BIBLIOGRAPHICAL REFERENCES

- Μεθοδολογικός οδηγός για την εκτίμηση και πρόληψη του επαγγελματικού κινδύνου, Σ. Δρίβας, Κ. Ζορμπά, Θ. Κουκουλάκη, Β' έκδοση, ΕΛΙΝΥΑΕ, Αθήνα 1998
- Επιδημιολογία και πρόληψη επαγγελματικών νόσων, Α. Λίνου, Αθήνα 1989
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- "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, 2nd 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.

APPLICATION EXAMPLE

OCCUPATION: ELECTRIC WELDER

PART A. GENERAL FACTS ABOUT THE OCCUPATION

1. THE JOB OF AN ELECTRIC WELDER

The electric welder joins metallic elements such as metal plates, sheets, machine elements or other type of parts by locally rendering the metal liquid with the use of electric currency.
Common tasks performed by a electric welder include:

- Carrying the parts and the electric welding equipment
- Fixturing of the parts to be welded
- Cleaning the surfaces of the parts to be welded
- Welding
- Removing the welded parts and the electric welding equipment.

The equipment used by an electric welder includes: welding machines and their subsidiary equipment (cables, electrode holders 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 AN ELECTRIC WELDER

- Electric shock and electrocution
- Inhalation of hazardous fumes produced from the melting of the metals, the electrodes and their coatings or from the reaction of the elements of the atmosphere with the welding arc
- Exposure to radiation (infrared, ultraviolet and visible)
- Burns from sparks or molten metal
- Fire / Explosion
- Injuries as a result of fall, crushing or smashing during the transportation, fastening or processing the parts.

3. MOST COMMON WORK RELATED DISEASES AND ILLNESSES RELEVANT TO THE JOB OF AN ELECTRIC WELDER

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

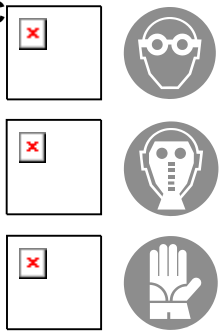
4. OTHER GROUPS OF WORKERS THAT ARE SUBJECT TO THE HAZARDS RELATED WITH THE JOB OF AN ELECTRIC WELDER

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 ELECTRIC WELDER

- Electric welding operations should only be performed by personnel having the electric 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 power supply should be switched off and 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:
  - 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.
- The welding machines and their subsidiary equipment should be kept in good condition and properly maintained. Other requirements include:
  - Grounding and cables should be checked for adequacy. Appropriate grounding installations are the necessary condition for the effective protection against electric shock hazard.
  - The use of thermoplastic cables should be avoided. Double insulated elastic cables should be preferred.
  - In every case the Internal Electrical Installations Regulation should be followed (K.E.H.E.)

6. PERSONAL PROTECTIVE EQUIPEMENT OF A ELECTRIC WELDER



- Apron (leather or other fire resistant material)
- Protective gloves (leather)
- Shield or helmet fitted with correct grade of filter glass
- Protective footwear with isolating sole and leather leggings
- Respirators or other breathing apparatus where necessary
- Ear-muffs in case of high noise level
- Leather head covering

Electric 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 the relevant EN Standards should be taken into account.

7. LEGISLATIVE REQUIREMENTS IN THE JOB OF AN ELECTRIC WELDER

A state license is needed for a worker to do the job of an electric welder.

8. NOTES AND REMARKS

The eye protection equipment used in gas welding operations is not appropriate for electric welding.
The risk of electric shock is only controlled with the appropriate grounding installations.
For welding or cutting operations in confined spaces (tanks, boilers etc) or in vessels that contained flammable material, special preventive measures should be taken and they should always be supervised by the competent work managers.
In case of welding processes with special safety requirements a more detailed risk assessment procedure should be applied.

9. DESCRIPTION OF THE PARTICULAR WORKPLACE

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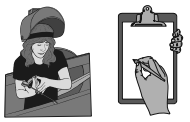
APPLICATION EXAMPLE

OCCUPATION: ELECTRIC WELDER



PART B. WRITTEN RISK ASSESSMENT

WORKPLACE:…… ASSESSMENT DATE:……..

1. HAZARDS ASSOCIATED WITH THE RAW MATERIALS USED			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Hazards associated with the raw material supply • Injuries as a result of carrying or lifting of the parts to be welded ……. ……. ……. …….			• The transportation should be done with the appropriate means (fork lift vehicle, conveyor, crane, trailer) • Use the appropriate PPE(protective gloves and footwear) ……. ……. ……. …….
Hazards associated with the temporary storage of the raw materials used • Injuries from the fall or misplacement of the parts to be welded ……. ……. ……. …….			• Correct rigging of the parts • Use the appropriate PPE (protective footwear) ……. ……. ……. …….
Other potential hazards associated with the raw materials used ……. ……. ……. ……. ……. ……. ……. …….			*Preventive and protective measures that are proposed* ……... ……... ……... ……... ……... ……... ……... ……...

2. HAZARDS ASSOCIATED WITH THE CURRENT PRODUCTION PROCEDURE			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Tools, Machinery, Fixtures etc in use. • Electrocution caused by worn cables or devices • Fire due to short circuit …… …… ……			 • Welding machines should be kept in good condition and properly maintained • Insulation should frequently be checked …… …… ……
Hazards associated with the work method used • Electrocution due to wrong connection or insufficient grounding • Fire caused by sparks fallen to nearby explosive or flammable materials …… …… ……			 • Provision of right connection order • Sufficient grounding. No water tubes, building beams, gas cylinders are allowed to be used for grounding purposes • Keep the workplace clean from flammable material • Keep confined spaces clean from flammable material and check their level • Suitable fire extinguishing apparatus should be placed in a nearby and easily reachable place. …… …… ……
Mechanical hazards and ergonomic faults in the workplace • Burns from sparks or molten metal …… …… ……			 • Use the appropriate PPE(leather apron, gloves, leggings) • Appropriately equipped first aid medical kit should be placed in a nearby and easily reachable place. …… …… ……
Other potential hazards associated with the current production procedure …… …… …… …… …… …… …… ……			*Preventive and protective measures that are proposed* …… …… …… …… …… …… …… ……

3. HAZARDS ASSOCIATED WITH THE WORKING ENVIRONMENT			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Physical Hazards • Insufficient lighting • Noise • High temperature ……			 • Improve lighting conditions locally • Use ear muffs • Noise screens, noise isolation • Elimination of the heat sources where possible • Natural or artificial ventilation • Air conditioning • Temperature control combined with humidity level ……
Chemical Hazards • Inhalation of hazardous fumes produced from the melting of the metals, the electrodes and their coatings • Inhalation of hazardous fumes produced from the reaction of the elements of the atmosphere with the welding arc ……			 • Use the appropriate PPE (shield or helmet) after contacting the electrodes' supplier • Sufficient local or general ventilation (working in confined spaces tanks, vessels etc without special protective measures is prohibited) • Clean the surfaces of the parts to be welded with the appropriate solvents ……
Radiation • Exposure to radiation ……			 • Protective screens erection • Use the appropriate PPE(shield or helmet fitted with filter glass) ……
Electricity • Electrocution or fire due to insecure electrical installations • Contact with high voltage components ……			 • The Internal Electrical Installations Regulation should be followed • Contact with the workpiece, the electrode should be avoided • Electrode holders should be placed in insulated bases • Workplace should be kept clean of spilled water and dangerous obstacles ……
Job site • Quick fire spread due to flammable construction material, large openings and lack of fire extinguishing apparatus • Injuries during the emptying of the premises in case of emergency ……			 • Suitable fire fighting system • Cover of the openings • Use of fire resistant construction material • Emergency exits should be kept open and easily reached • Appropriate safety signs ……
Other potential hazards associated with the working environment ……			*Preventive and protective measures that are proposed* ……

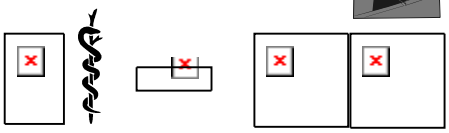
4. HAZARDS ASSOCIATED WITH THE FINAL PRODUCT AND SUBPRODUCTS			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Hazards associated with taking away of the final product and subproducts • Burns cased by recently welded parts • Injuries as a result of taking away the welded parts ……			• Warn passers by and persons in close workplaces. Safety signs on recently welded parts • Use the appropriate PPE (protective gloves and footwear) • The transportation should be done with the appropriate means (fork lift vehicle, conveyor, crane, trailer) ……
Hazards associated with the temporary storage of the final product and subproducts • Injuries as a result of fall or displacement during the storage of the welded parts ……			• Use the appropriate PPE (protective gloves and footwear) • Stack and secure the stored parts safely ……
Other potential hazards associated with the final product and subproducts: …… …… …… ……			*Preventive and protective measures that are proposed* …… …… …… ……

5. OTHER TYPES OF HAZARD			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Hazards associated with the poor organization of work • Working instructions that are not clear ……			• Clear and explicit working instructions • Clearly defined tasks and duties ……
Hazards associated with psychological factors • Time pressure • Poor cooperation with co-workers and supervisors ……			• Appropriate work schedule • Conditions that promote good cooperation ……
Hazards associated with the particular requirements of the work and the particularities of the specific workplace …… …… …… …… ……			

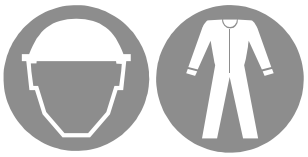
SAFEGUIDE OCCUPATIONAL HEALTH & SAFETY RISK ASSESSMENT GUIDE

APPLICATION EXAMPLE

OCCUPATION: ELECTRIC WELDER



PART C. POTENTIAL HAZARDS AND PERSONAL PROTECTIVE EQUIPMENT

		PART OF THE BODY AT RISK												
		HEAD					UPPER LIMBS		LOWER LIMBS		GENERAL			
		SCULL	EARS	EYES	FACE	RESPIRAT. TRACK	HANDS	ARMS	FEET	LEGS	SKIN	ABDOMEN	WHOLE BODY	OTHER IDENTIFIED PART OF THE BODY AT RISK
POSSIBLE HAZARDS														
MECHANICAL	FALLS FROM HEIGTS													
	BURNS – CUTS												X	
	IMPACT – CRUSHING – ENTANGLEMENT						X		X					
	VIBRATION													
	SLIPS													
ELECTRICAL													X	
THERMAL	HEAT-FLAMES												X	
	COLD													
RADIATION	NON IONISING			X								X		
	IONISING													
NOISE														
CHEMICAL	GASES-VAPOURS													
	FUMES													
	MISTS													
	IMMERSION													
	SPLASHES													
GASES-VAPOURS						X								
BIOLOGICAL	HARMFUL BACTERIA													
	HARMFUL VIRUS													
	FUNGI													
PROPOSED PERSONAL PROTECTIVE EQUIPMENT 		HELMET	EAR MUFFS	GOGGLES	FACE PROT.	RESPIR. DEV.	GLOVES	PROT. CLOTHING	FOOTWEAR	PROT. CLOTHING	OINTMENTS	PROT. CLOTHING	PROTECTIVE CLOTHING, PROTECTIVE EQUIPMENT AGAINST FALLS FROM A HEIGHT ETC	PROPER PROTECTIVE EQUIPMENT

APPLICATION EXAMPLE

OCCUPATION: ELECTRIC WELDER

PART D. LEGISLATION - STANDARDS - REFERENCES

1. RELEVENT 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

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, www.idec.gr/ppe, www.cenorm.be

3. SPECIALISED BIBLIOGRAPHICAL REFERENCES

- Μεθοδολογικός οδηγός για την εκτίμηση και πρόληψη του επαγγελματικού κινδύνου, Σ. Δρίβας, Κ. Ζορμπά, Θ. Κουκουλάκη, Β' έκδοση, ΕΛΙΝΥΑΕ, Αθήνα 1998
- Επιδημιολογία και πρόληψη επαγγελματικών νόσων, Α. Λίνου, Αθήνα 1989
- "ΥΓΕΙΑ ΚΑΙ ΑΣΦΑΛΕΙΑ ΣΤΗΝ ΕΡΓΑΣΙΑ" Αθήνα 1987, Άρθρο "ΗΛΕΚΤΡΟΚΟΛΛΗΣΕΙΣ-ΟΞΥΓΟΝΟΚΟΛΛΗΣΕΙΣ", Σωτήρης Ασλάνης, Χημικός, Τεχν. Επιθεωρητής Υπ. Εργασίας
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- Handbook of Occupational Safety and Health, pp. 85-98, 2nd edition, 1999 John Wiley and Sons.
- Encyclopaedia of Occupational Health and Safety, ILO.
- Electrical Safety Code, Institute of Petroleum, John Wiley & Sons, London 1991
- Κανονισμός Εσωτερικών Ηλεκτρικών Εγκαταστάσεων, Μιλτ. Κάπου, Αθήνα 1985, (Έκδοση του Ιδίου).
- "Guidance on risk assessment at work", European Commission, Directorate-General V Employment, Industrial relations and social affairs.

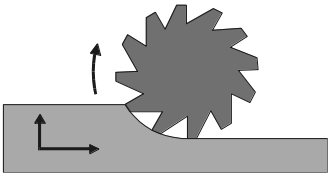
APPLICATION EXAMPLE

OCCUPATION: MACHINE TOOL OPERATOR

PART A. GENERAL FACTS ABOUT THE OCCUPATION

1. THE JOB OF A MACHINE TOOL OPERATOR

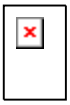
Machine tools operators are responsible for the production of metal elements by operating machine tools such as lathe, miller, planer, drill press, surface grinder and a wide range of modern CNC machine tools.
Common tasks performed by an electric welder include:



- Carrying the parts and locating the workpieces
- Mounting and fixturing of the parts to be machined
- Adjusting the machine parameters (cutting speed, cutting tool, coolants etc)
- Surveillance of the work, checking the workpieces and the machines
- Taking away the machined parts
- Keeping the workplace clean, collect and remove the chips and the swarf.

The equipment used by a machine tool operator includes: machine tools, cutting tools, adjustment tools, hand tools and mechanical aids to assist in moving, lifting and fastening of the parts.

2. MOST COMMON HAZARDS RELEVANT TO THE JOB OF A MACHINE TOOL OPERATOR



- Injuries (crushing, snagging) from moving machine parts
- Injuries as a result of flying components (chips, workpieces inadequately secured)
- Injuries as a result of carrying the workpieces
- Injuries during the chip and swarf removal
- Slip- fall hazard due to liquids, oil spills and garbage existing in the workplace.

3. MOST COMMON WORK RELATED DISEASES AND ILLNESSES RELEVANT TO THE JOB OF A MACHINE TOOL OPERATOR

- Dermatitis from contact with coolants and cutting fluids
- Operational deafening
- Permanent bronchitis, asthma
- Myosceletical problems due to inappropriate working posture
- Possible cancer due to the use of poly-aromatic hydrocarbons (PAHs).

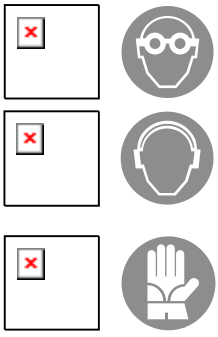
4. OTHER GROUPS OF WORKERS THAT ARE SUBJECT TO THE HAZARDS RELATED WITH THE JOB OF A MACHINE TOOL OPERATOR

Persons working near or passing by the machine tool operators' workplace are also exposed at flying chips and high noise level hazards.

5. PREVENTIVE MEASURES IN THE JOB OF A MACHINE TOOL OPERATOR

- All the machines should be kept in good conditions and periodically checked and maintained according to the manufacturers' instructions.
- Protective covers should be kept in good condition and should not be removed.
- Machinery and tools should only be used for the purpose they were made for.
- Machine tools should only be operated by well trained, specialised and experienced personnel.
- Protective devices preventing hand or finger contact with the machines' moving parts to be installed where possible.
- Machine tools should not be left to work unattended.
- Machine tool operators should always use the appropriate PPE (see unit 7).
- Before starting any operation it is necessary to check the correct location and fixturing of the workpiece and also check for any forgotten tools on the bed of the machine.
- Manual checking adjustments and gauging work is prohibited while the machine is in operation.
- Maintenance and repair work must only be carried out with the machine not working and isolated from the power supply.
- The workplace should be kept tidy and obstacle free. Other requirements may include:
  - 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.
- Chip and swarf removal should only be done using the appropriate tools (swarf hook), not with the use of compressed air.
- The cutting fluid tank should be kept clean. No garbage or litter is allowed.
- Electrical Installations should follow the Internal Electrical Installations Regulation should be followed (K.E.H.E.).

6. PERSONAL PROTECTIVE EQUIPEMENT OF A MACHINE TOOL OPERATOR



- Safety Spectacles
- Protective footwear
- Apron
- Gloves (not while operating rotating machinery)
- Helmet
- Close fitting clothing.

Machine tool operators having long hair should tie them up or wear a cap. No finger rings, bracelets etc. are allowed when working.

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

7. LEGISLATIVE REQUIREMENTS IN THE JOB OF A MACHINE TOOL OPERATOR

A state licence is not necessary for a worker to do the job of a machine tool operator. The duties are assigned from the employer, who is responsible for the sufficient training and the proper adaptation of the worker to his tasks.

8. NOTES AND REMARKS

When working with conventional machine tools (nor CNC closed type) close fitting clothing should be worn and the sleeves must be tightly buttoned at the wrists. Be careful of eye injuries. Protective gloves should only be worn whenever swarf is being collected.

9. DESCRIPTION OF THE PARTICULAR WORKPLACE

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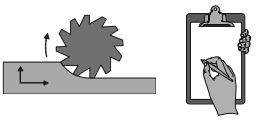
APPLICATION EXAMPLE

OCCUPATION: MACHINE TOOL OPERATOR



PART B. WRITTEN RISK ASSESSMENT

WORKPLACE:…… ASSESSMENT DATE:……..

1. HAZARDS ASSOCIATED WITH THE RAW MATERIALS USED			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Hazards associated with the raw material supply • Injuries as a result of carrying or lifting of the workpieces …… …… …… ……			• The transportation should be done with the appropriate means (fork lift vehicle, conveyor, crane, trailer) • Use the appropriate PPE (protective gloves and footwear) …… …… …… ……
Hazards associated with the temporary storage of the raw materials used • Injuries from the fall or misplacement of the workpieces …… …… …… ……			• Appropriate storage (rigging, stacking securing) • Use the appropriate PPE (protective footwear) …… …… …… ……
Other potential hazards associated with the raw materials used …… …… …… …… …… …… …… ……			*Preventive and protective measures that are proposed* …… …… …… …… …… …… …… ……

2. HAZARDS ASSOCIATED WITH THE CURRENT PRODUCTION PROCEDURE			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Tools, Machinery, Fixtures etc in use. • Injuries due to uncovered moving machine parts or badly maintained machinery • Injuries from tools ……			• Proper maintenance, frequent checks of the machines • Protecting covers in good condition and not removed • Machinery and tools should only be used for the purpose they were made for ……
Hazards associated with the work method used • Injuries caused by long workpieces projecting beyond the machine tool (e.g. long bars) • Injuries caused from the ejection of the workpiece due to inadequate clamping or fixturing or the ejection of adjustment tools • Injuries from cutting tools • Injuries during the chip and swarf removal ……			• Appropriate fixturing and clamping of the parts of the workpieces that are projecting beyond the machine tool (e.g. in a protective tube) • Check the correct mounting and fixturing of the workpiece • All adjustment tools should be removed before the machine is put into operation • While the machine is in operation manual checking adjustments and gauging work is prohibited • After the operation is finished, cutting tools should not be left around the workplace • The machines should not left to operate unattended • Use appropriate tool for the removal of the chips and swarf • Chip removal should only be done with the machine out of operation ……
Hazards associated with repair and maintenance works • Injuried during repair and maintenance works ……			• Maintenance and repair work must only be carried out with the machine not working and isolated from the power supply ……
Mechanical hazards and ergonomic faults in the workplace • Sleeve, hair, jewellery caught from machine rotating parts • Slip-fall due to oil or liquid • Myosceletical problems due to inappropriate working posture • Insufficient working space ……			• Close fitting clothing, no free-hanging long hair, no finger rings or bracelets • The space around the machine should be kept clean • Ergonomic design of the workplace ……
Other potential hazards associated with the current production procedure ……			*Preventive and protective measures that are proposed* ……

3. HAZARDS ASSOCIATED WITH THE WORKING ENVIRONMENT			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Physical Hazards • Insufficient lighting • Noise …… …… …… ……			 • Improve lighting conditions locally • Use ear muffs • Noise screens, noise isolation • Proper maintenance, frequent lubrication …… …… …… ……
Chemical Hazards • Dermatitis from contact with coolants and cutting fluids …… …… …… ……			 • Use the appropriate PPE (gloves) • Avoid skin contact with cutting fluids …… …… …… ……
Electricity • Electrocution or fire due to insecure electrical installations …… …… …… ……			 • The Internal Electrical Installations Regulation should be followed …… …… …… ……
Job site • Quick fire spread due to flammable construction material, large openings and lack of fire extinguishing apparatus • Injuries during the emptying of the premises in case of emergency …… …… …… ……			 • Suitable fire fighting system. • Use of fire resistant construction material • Emergency exits should be kept open and easily reached • Appropriate safety signs …… …… …… ……
Other potential hazards associated with the working environment …… …… …… …… …… …… ……			*Preventive and protective measures that are proposed* …… …… …… …… …… …… ……

4. HAZARDS ASSOCIATED WITH THE FINAL PRODUCT AND SUBPRODUCTS			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Hazards associated with taking away of the final product and subproducts • Injuries as a result of taking away the machined workpieces …… ……			• Use the appropriate PPE (protective gloves and footwear) • The transportation should be done with the appropriate means (fork lift vehicle, conveyor, crane, trailer) …… ……
Hazards associated with the temporary storage of the final product and subproducts • Injuries as a result of fall or displacement during the storage of the machined workpieces …… ……			• Use the appropriate PPE (protective gloves and footwear) • Appropriate storage (rigging, stacking securing) …… ……
Other potential hazards associated with the final product and subproducts: …… …… …… …… ……			*Preventive and protective measures that are proposed* …… …… …… …… ……

5. OTHER TYPES OF HAZARD			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Hazards associated with the poor organisation of work • Working instructions that are not clear …… ……			• Clear and explicit working instructions • Clearly defined tasks and duties …… ……
Hazards associated with psychological factors • Time pressure • Poor cooperation with co-workers and supervisors …… ……			• Appropriate work schedule • Conditions that promote good cooperation …… ……
Hazards associated with the particular requirements of the work and the particularities of the specific workplace …… …… …… ……			

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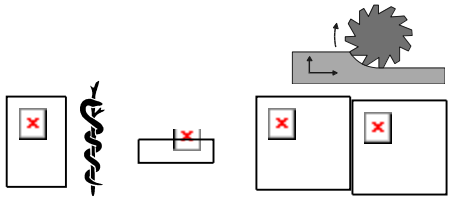
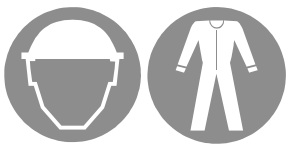
APPLICATION EXAMPLE

OCCUPATION: MACHINE TOOL OPERATOR

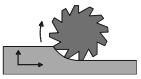


PART C. POTENTIAL HAZARDS AND PERSONAL PROTECTIVE EQUIPMENT

		PART OF THE BODY AT RISK													
		HEAD					UPPER LIMBS		LOWER LIMBS		GENERAL				
		SCULL	EARS	EYES	FACE	RESPIRAT. TRACK	HANDS	ARMS	FEET	LEGS	SKIN	ABDOMEN	WHOLE BODY	OTHER IDENTIFIED PART OF THE BODY AT RISK
POSSIBLE HAZARDS														
MECHANICAL	FALLS FROM HEIGTS													
	BURNS – CUTS													
	IMPACT – CRUSHING – ENTANGLEMENT												X	
	VIBRATION													
	SLIPS												X	
ELECTRICAL													X	
THERMAL	HEAT-FLAMES													
	COLD													
RADIATION	NON IONISING													
	IONISING													
NOISE			X											
CHEMICAL	GASES-VAPOURS													
	FUMES													
	MISTS													
	IMMERSION													
	SPLASHES										X			
GASES-VAPOURS														
BIOLOGICAL	HARMFUL BACTERIA													
	HARMFUL VIRUS													
	FUNGI													
PROPOSED PERSONAL PROTECTIVE EQUIPMENT 		HELMET	EAR MUFFS	GOGGLES	FACE PROT.	RESPIR. DEV.	GLOVES	PROT. CLOTHING	FOOTWEAR	PROT. CLOTHING	OINTMENTS	PROT. CLOTHING	PROTECTIVE CLOTHING, PROTECTIVE EQUIPMENT AGAINST FALLS FROM A HEIGHT ETC	PROPER PROTECTIVE EQUIPMENT

APPLICATION EXAMPLE

OCCUPATION: MACHINE TOOL OPERATOR



PART D. LEGISLATION - STANDARDS - REFERENCES

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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. 377/1993 "Προσαρμογή της Ελληνικής Νομοθεσίας στις Οδηγίες 89/392/ΕΟΚ και 91/368/ΕΟΚ του Συμβουλίου των Ευρωπαϊκών Κοινοτήτων σχετικά με τις μηχανές."
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

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

ENV 340	Protective clothing: General Requirements
EN 388-94	Protective gloves against mechanical risks
EN 510	Specification for protective clothing for use, where there is risk of entanglement with moving parts
EN 420-94	General requirements for gloves
EN 458-94	Hearing protectors – Recommendations for selection use care and maintenance – Guidance document
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
EN 1550-97	Machine tools safety – safety requirements for the design and construction of work holding chucks

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

3. SPECIALISED BIBLIOGRAPHICAL REFERENCES

- Μεθοδολογικός οδηγός για την εκτίμηση και πρόληψη του επαγγελματικού κινδύνου, Σ. Δρίβας, Κ. Ζορμπά, Θ. Κουκουλάκη, Β' έκδοση, ΕΛΙΝΥΑΕ, Αθήνα 1998
- Επιδημιολογία και πρόληψη επαγγελματικών νόσων, Α. Λίνου, Αθήνα 1989
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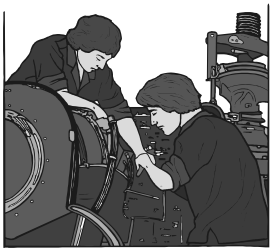
- "Υγεία και ασφάλεια στην εργασία": Υπουργείο εργασίας, Αθήνα 1987
- BS 8800 : 1996 "Occupational health and safety management systems"
- Croner's Risk Assessment, Croner Publications Ltd., Surrey 1995
- Handbook of Occupational Safety and Health, pp. 85-98, 2nd edition, 1999 John Wiley and Sons
- Encyclopaedia of Occupational Health and Safety, ILO.
- "Guidance on risk assessment at work", European Commission, Directorate-General V Employment, Industrial relations and social affairs.

APPLICATION EXAMPLE

OCCUPATION: FITTER

PART A. GENERAL FACTS ABOUT THE OCCUPATION

1. THE JOB OF A FITTER

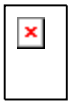


A Fitter is responsible for maintenance and repair of machine elements, machine parts and machinery equipment in general.
Common tasks performed by a fitter include:

- Assembling and disassembling machine parts
- Repair maintenance and fitting
- General purpose tasks.

The equipment used by a fitter includes: hand tools, workbench tools and mechanical aids to assist in moving and lifting of the parts (cranes, conveyors etc).

2. MOST COMMON HAZARDS RELEVANT TO THE JOB OF A FITTER



- Injuries as a result of carrying or lifting the machine parts or assemblies that he is working with
- Injuries (smashing, falling material, electric shock) during assembling and repair works
- Fall from a height, slips.

3. MOST COMMON WORK RELATED DISEASES AND ILLNESSES RELEVANT TO THE JOB OF A FITTER

- Myosceletical problems due to inappropriate working posture and manual carrying or lifting of heavy loads
- Skin diseases due to contact with lubricants, solvents
- Reynaud's syndrome (vibration white finger) caused by extensive use of vibrating tools.

4. OTHER GROUPS OF WORKERS THAT ARE SUBJECT TO THE HAZARDS RELATED WITH THE JOB OF A FITTER

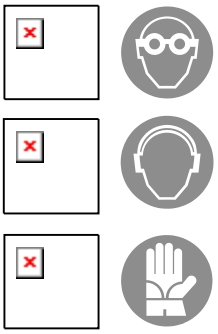
- Personnel within the vicinity of the fitters, mainly from falling material or accidental starting of the involved machinery
- Personnel using the equipment that is maintained repaired assembled by the fitter.

5. PREVENTIVE MEASURES IN THE JOB OF A FITTER

- All the tools that are used should comply with the safety requirements (CE marking), should be kept in proper condition and used only for the purposes that they were manufactured for
- Protective covers should be kept in good condition and should not be removed
- Fitters should always use the appropriate PPE (see unit 7)
- Before starting any operation it is necessary to check the correct mounting and fixturing of the workpiece
- Maintenance and repair work must only be carried out with all the involved machinery not working and isolated from the power supply
- When using lifting equipment it is necessary to check if it is safety mounted, load limit clearly indicated and its components properly maintained.

- Manual checking adjustments and gauging work is prohibited, while the involved machinery is in operation
- The workplace should be kept tidy and obstacle free. Other requirements may include:
  - 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.
- Electrical Installations should follow the Internal Electrical Installations Regulation should be followed (K.E.H.E.).

6. PERSONAL PROTECTIVE EQUIPEMENT OF A FITTER



- Helmet
- Protective footwear
- Gloves (during specific tasks)
- Safety Spectacles (when using cutting hand tools)
- Close fitting clothing

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

7. LEGISLATIVE REQUIREMENTS IN THE JOB OF A FITTER

A state licence is not necessary for a worker to do the job of a fitter. The duties are assigned from the employer who is responsible for the sufficient training and the proper adaptation of the worker to his tasks. This is not the case for some specialised maintenance works (e.g. license is needed for maintenance jobs that concern electrical installations of a certain class)

8. NOTES AND REMARKS

Because of the diversity of the tasks and the workplaces where a fitter works, special care should be taken for the assignment and use of the appropriate personal protective equipment.

9. DESCRIPTION OF THE PARTICULAR WORKPLACE

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……
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SAFEGUIDE OCCUPATIONAL HEALTH & SAFETY RISK ASSESSMENT GUIDE

APPLICATION EXAMPLE

OCCUPATION: FITTER

PART B. WRITTEN RISK ASSESSMENT

WORKPLACE:…… ASSESSMENT DATE:……..

1. HAZARDS ASSOCIATED WITH THE RAW MATERIALS USED			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Hazards associated with the raw material supply • Injuries as a result of carrying or lifting of the parts or assemblies …….. …….. …….. ……..			• The transportation should be done with the appropriate means (fork lift vehicle, conveyor, crane, trailer) • Use the appropriate PPE (protective gloves and footwear) …….. …….. …….. ……..
Hazards associated with the temporary storage of the raw materials used • Injuries as a result of fall or misplacement of the parts or assemblies left over in random places in the workplace …….. …….. …….. ……..			• Appropriate storage (rigging, stacking securing) • Use the appropriate PPE (protective footwear) …….. …….. …….. ……..
Other potential hazards associated with the raw materials used …… …… …… …… …… …… …… ……			*Preventive and protective measures that are proposed* …… …… …… …… …… …… …… ……

2. HAZARDS ASSOCIATED WITH THE CURRENT PRODUCTION PROCEDURE			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Tools, Machinery, Fixtures etc in use. • Injuries caused from falling of lifted materials due to lifting equipment failure • Injuries caused from the failure of tools or fixtures (e.g. wrench with welded handling extension) …… ……			• Proper maintenance, frequent checks of the machines • Protecting covers in good condition and not removed • Machinery and tools should only be used for the purpose they were made for • Correct use, proper maintenance, frequent checks of the lifting equipment • All tools should be kept in proper condition and used only for the purposes that they were manufactured for …… ……
Hazards associated with the work method used • Injuries as a result of the use of portable hand tools (saw, drill, grinding wheel) • Injuries due to inappropriate mounting and fixturing of the repaired parts, assemblies, elements • Injuries caused by moving machine parts …… ……			• Correct use, proper maintenance, frequent checks of the used tools • Use the appropriate PPE • Check for the appropriate mounting and fixturing of the part • Maintenance and repair work must only be carried out with all the involved machinery not working and isolated from the power supply. …… ……
Mechanical hazards and ergonomic faults in the workplace • Fall from a height • Myosceletical problems due to inappropriate working posture and manual carrying or lifting of heavy loads …… ……			• Protective equipment against falls from a height (fall arresters, lanyards etc) • Ergonomic design of the workplace • The transportation of loads should be done with the appropriate means …… ……
Other potential hazards associated with the current production procedure …… …… …… ……			*Preventive and protective measures that are proposed* …… …… …… ……

3. HAZARDS ASSOCIATED WITH THE WORKING ENVIRONMENT			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Physical Hazards • Insufficient lighting • Noise • Foul weather …… …… ……			 • Improve lighting conditions locally • Use ear muffs • Use the appropriate PPE …… …… ……..
Chemical Hazards • Dermatitis from contact with lubricants, solvents etc …… …… ……			 • Use the appropriate PPE (gloves) …… …… ……
Electricity • Electric shock due to contact with high voltage components …… …… ……			 • Use double insulated powered electrical hand tools • Cables and tools should be frequently checked • Repair work must only be carried out with all the involved machinery isolated from the power supply. • The Internal Electrical Installations Regulation should be followed …… …… ……
Job site • Injuries during the emptying of the premises in case of emergency …… …… ……			 • Emergency exits should be kept open and easily reached • Appropriate safety signs …… …… ……
Other potential hazards associated with the working environment …… …… …… …… …… …… …… ……			*Preventive and protective measures that are proposed* …… …… …… …… …… …… …… ……

4. HAZARDS ASSOCIATED WITH THE FINAL PRODUCT AND SUBPRODUCTS			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Hazards associated with the taking away of the final product and subproducts • Injuries as a result of taking away the repaired workpieces …… …… ……			• Use the appropriate PPE (protective gloves and footwear) • The transportation should be done with the appropriate means (fork lift vehicle, conveyor, crane, trailer) …… …… ……
Other potential hazards associated with the final product and subproducts: …… …… …… …… …… …… ……			*Preventive and protective measures that are proposed* …… …… …… …… …… …… ……

5. OTHER TYPES OF HAZARD			
POTENTIAL HAZARDS	**LIK.**	**SEV.**	**PREVENTIVE/ PROTECTIVE MEASURES**
Hazards associated with the poor organisation of work • Working instructions that are not clear …… …… ……			• Clear and explicit working instructions • Clearly defined tasks and duties …… …… ……
Hazards associated with psychological factors • Time pressure • Poor cooperation with co-workers and supervisors …… …… ……			• Appropriate work schedule • Conditions that promote good cooperation …… …… ……
Hazards associated with the particular requirements of the work and the particularities of the specific workplace …… …… …… …… …… …… ……			

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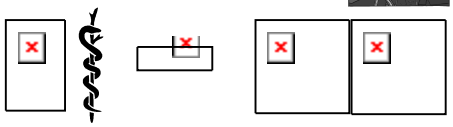
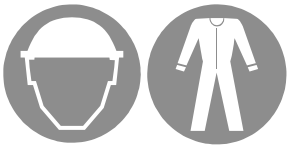
APPLICATION EXAMPLE

OCCUPATION: FITTER



PART C. POTENTIAL HAZARDS AND PERSONAL PROTECTIVE EQUIPMENT

		PART OF THE BODY AT RISK												
		HEAD					UPPER LIMBS		LOWER LIMBS		GENERAL			
		SCULL	EARS	EYES	FACE	RESPIRAT. TRACK	HANDS	ARMS	FEET	LEGS	SKIN	ABDOMEN	WHOLE BODY	OTHER IDENTIFIED PART OF THE BODY AT RISK
POSSIBLE HAZARDS														
MECHANICAL	FALLS FROM HEIGTS												X	
	BURNS – CUTS													
	IMPACT – CRUSHING – ENTANGLEMENT												X	
	VIBRATION													
	SLIPS												X	
ELECTRICAL													X	
THERMAL	HEAT-FLAMES												X	
	COLD												X	
RADIATION	NON IONISING													
	IONISING													
NOISE			X											
CHEMICAL	GASES-VAPOURS													
	FUMES													
	MISTS													
	IMMERSION													
	SPLASHES						X				X			
GASES-VAPOURS														
BIOLOGICAL	HARMFUL BACTERIA													
	HARMFUL VIRUS													
	FUNGI													
PROPOSED PERSONAL PROTECTIVE EQUIPMENT 		HELMET	EAR MUFFS	GOGGLES	FACE PROT.	RESPIR. DEV.	GLOVES	PROT. CLOTHING	FOOTWEAR	PROT. CLOTHING	OINTMENTS	PROT. CLOTHING	PROTECTIVE CLOTHING, PROTECTIVE EQUIPMENT AGAINST FALLS FROM A HEIGHT ETC	PROPER PROTECTIVE EQUIPMENT

APPLICATION EXAMPLE

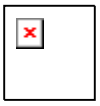
OCCUPATION: FITTER

PART D. LEGISLATION - STANDARDS - REFERENCES

1. RELEVENT 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. 377/1993 "Προσαρμογή της Ελληνικής Νομοθεσίας στις Οδηγίες 89/392/ΕΟΚ και 91/368/ΕΟΚ του Συμβουλίου των Ευρωπαϊκών Κοινοτήτων σχετικά με τις μηχανές".
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



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

ENV 340	Protective clothing: General Requirements
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EN 420-94	General requirements for gloves
EN 379 –95	Industrial safety helmets
EN 812-99	Industrial bump caps
EN 8662-97	Hand – held portable powered tools – Measurement of vibrations at the handle. Part 6: Impact drills, Part 7: Wrenches, screwdrivers, and nut runners with impact, impulse or ratchet action, Part 8: Polishers and rotary, orbital and random orbital sanders
EN 345 –95	Specification for safety footwear for professional use
EN 346-93	Specification for safety footwear for professional use

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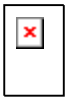
- Βιομηχανικοί διαλύτες, ΕΛΙΝΥΑΕ, Αθήνα 1999
- BS 8800 : 1996 "Occupational health and safety management systems"
- Croner's Risk Assessment, Croner Publications Ltd., Surrey 1995
- Handbook of Occupational Safety and Health, pp. 85-98, 2nd edition, 1999 John Wiley and Sons
- Safety and health in the use of chemicals at work, C.M.A. Bakar, D. Gold, ILO, Geneva 1993
- Encyclopaedia of Occupational Health and Safety, ILO
- "Guidance on risk assessment at work", European Commission, Directorate-General V Employment, Industrial relations and social affairs.

A P P E N D I X E S

APPENDIX 1 : COMMON HAZARDS MET IN THE INDUSTRIAL WORKING ENVIRONMENT

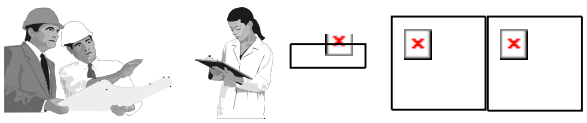


CATEGORY	TYPE OF HAZARD	POTENTIAL HAZARD SOURCES
MECHANICAL HAZARDS	Getting caught by moving machine parts	Vee belt and pulley, hydraulic cylinders,
	Snagging	Sharp – uncovered machine parts
	Crushing (hands or limbs)	Moving vehicles, robot arms, moving machine parts
	Puncture, perforation	Drills, saws
	Cutting	Presses, scissors
	Vibrations	Pneumatic drill
	Ejection of work piece or part of tool	Machine tools, presses
	Contact with abrasive or cutting tools	Knifes, chisel, saw, abrasive wheel
	Falling objects	Insecure stacks, inadequate racking, load carried by crane
	Fall from a height	Work at heights, ladders, scaffolds, excavations, holes on the floor
	Sliding on rough surfaces – slips	Oil spills, water on floors, uneven steps, changes in floor level
	Fall into substances, drowning, poisoning, suffocation	Works in silos, on bridges, near canals
	Moving vehicle	Fork lift vehicle
	Hit by object that has stored energy	Springs under tension, or compression, belts
	Release of energy	Compressed air, compressed gas, steam boilers, hydraulic systems
THERMAL HAZARDS	Contact with open flame or hot gases	Welding operations
	Molten or incandescent material projections	Welding operations, molten metal transportation
	Contact with hot surfaces	Welding operations
	Thermal radiation	Molten metal transportation
ELECTRICAL HAZARDS	Electrocution	Electricity above 220V, improperly maintained electrical installations, cables
	Accumulation of static charges leading to explosion	Static, Batteries
CHEMICAL HAZARDS	Aerosols - Particles	Paint works
	Dust – Fibres	
	Mists	
	Fumes	Rubber fume
	Handling – Transportation storage of chemical substances (Acid, Caustic, Toxic, Irritant)	Acid, base, solvent, oil
	Gases – Vapours	
	Handling – Transportation of explosives	

BIOLOGICAL HAZARDS	Harmful bacteria	
	Harmful virus	
	Fungi	
	Contaminated dust, aerosols	
	Contaminant liquids (blood, water), contact with contaminated solids	Clothes, faeces, carrion
RADIATION	Ionising radiation	Sources of such radiation type
	Non ionising radiation (Micro wave, Infrared, Ultra violet, Laser)	Sources of such radiation type
HAZARDS ASSOCIATED WITH THE WORKING ENVIRONMENT	Insufficient lighting	
	Noise level over the acceptable limit	
	Hot climatic conditions (risk of heat stroke due to combination of protective clothing and work strain)	
	Cold	
	Handling cryogenic liquids and solids	
	Rapidly changing conditions	
	Foul weather (rain, snow, wind)	Outdoor work

APPENDIX 2 : PERSONAL PROTECTIVE EQUIPMENT ASSIGNMENT

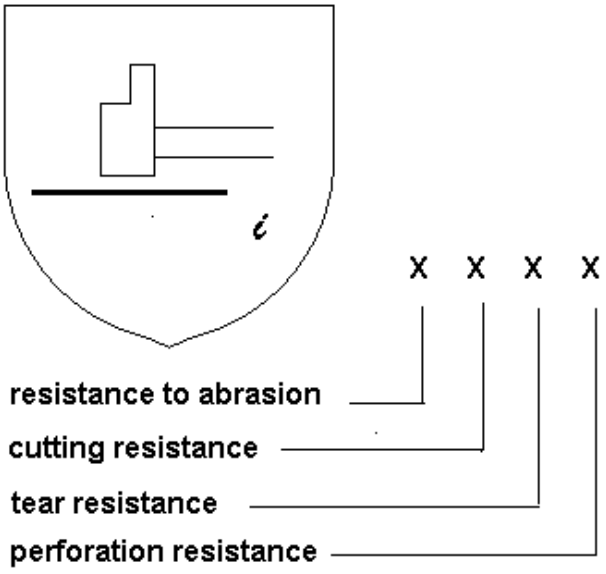
The selection of the appropriate Personal Protective Equipment should be done with the necessary care by the employer, the Safety engineer and the Labour Doctor.



All PPE articles should have the appropriate CE marking, as well as pictograms related to the risks that they are protecting from.

For the selection of PPE the likelihood and severity levels of the risk should be taken in mind. On the label of a Personal Protective Equipment, apart from the relevant pictograms, the relevant EN standard concerning the necessary requirements for its manufacturing and use should also be indicated.

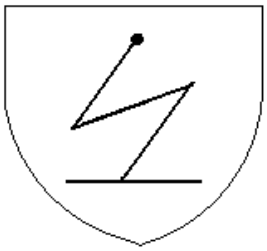
Most pictograms contain some numbers that concern the level of their protective characteristics, for instance in EN 388 Standard that concerns the protective gloves from mechanical risks the following pictogram is used for the indication of the values that several of its characteristics have.



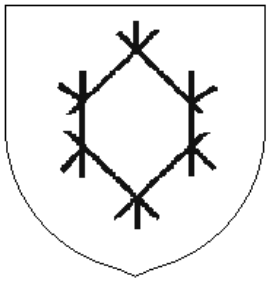
(where “X” the arithmetic value of the characteristic)

PICTOGRAMS USED IN PPE

PROTECTION AGAINST FOUL WEATHER

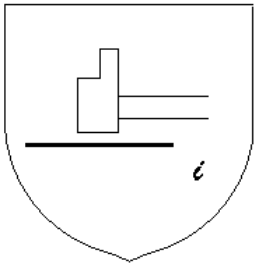


PROTECTION AGAINST STATIC ELECTRICITY

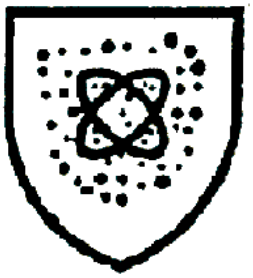


PROTECTION AGAINST COLD

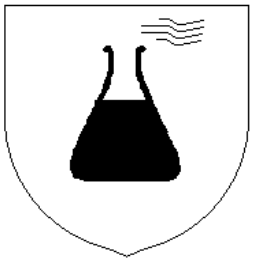
PROTECTION AGAINST HEAT AND FLAME



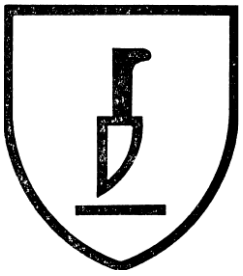
PROTECTION AGAINST MECHANICAL RISKS



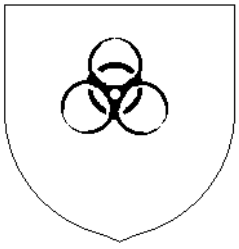
PROTECTION AGAINST RADIO-ACTIVE CONTAMINATION



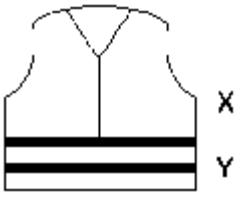
PROTECTION AGAINST CHEMICALS



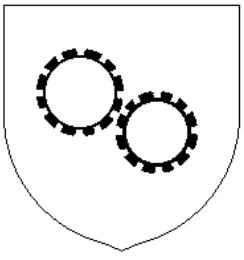
PROTECTION AGAINST IMPACT CUT



PROTECTION AGAINST MICRO-ORGANSISMS



PROTECTION AGAINST LOW VISIBILITY



PROTECTION AGAINST MOVING PARTS

PROTECTION AGAINST HEAT AND FIRE HAZARD FOR FIRE FIGHTERS

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