



Education and Culture

# Leonardo da Vinci

**Course: Health, Safety and Environment**  
**Module 4**

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## **MODULE 4**

### ***Objective:***

***Know and understand hazards and basic safety requirements when welding.***

### ***Scope:***

Welding fumes  
Respiratory hazards  
Personal protective equipment and clothing  
Noise hazards

### ***Expected results:***

Know the health risks of welding fumes  
Know the personal protective equipment  
Know the respiratory hazards

### **Personal protective equipment and clothing**

Personal protective equipment especially designed for the task at hand must always be used when arc welding. Protective clothing must not be heavily soiled or torn.

#### **1. Head Protection**

This provides protection

- a) against falls (e.g. crash helmets, cycle helmets, climbing helmets)
- b) against falling objects or against striking fixed objects
- c) against striking fixed objects (e.g. objects in confined spaces).

#### **2. Eye Protection**

Welding helmet

A welding helmet must always be worn when welding to protect the eyes and face from radiation and welding spatter.

The welding helmet can be lowered in front of the face. The lens should be lowered using one hand instead of the "chin-up" method as repeated nodding can cause neck injuries.

Welding lenses

Welding helmets and welding lenses both have dark glass, so-called welding lenses. The welding lens is used to filter out UV and IR radiation. Only visible light is allowed to pass the lens.

Lens protector

Lens protectors are used in welding helmets and shields to protect the welding lens from spatter.

Automatic welding lenses

Automatic anti-dazzle welding lenses are also available. This type of welding lens darkens automatically the moment the arc is ignited and becomes lighter again when the arc is extinguished. Automatic welding lens can be set to different densities.

Welding helmet with fresh-air supply

Equipment is available for supplying fresh and cool air to the welding helmet. The positive pressure created inside the welding helmet prevents weld smoke from mixing with the air the welder inhales. Comfort is also enhanced and mist is prevented from forming on the welding lens.

Relevant standards:

a) EN169 welding filters

b) EN175 welding eye protectors

Always choose eye protection appropriate to the hazard and ensure that fits properly and is comfortable.

Dirty lenses impair vision, causing eye fatigue and leading to accidents. The plastic lenses of eye protectors should be wet cleaned to avoid scratching; scratched lenses should be replaced, as should face shields if they become crazed or brittle with age.

Safety spectacles and goggles should be issued on a personal basis and should be thoroughly cleaned before issue to someone else.

### **3. Foot Protection**

Safety footwear should comply with EN 345 (with toe protection of 200 or 100 joules). Footwear with anti-static or slip resistant properties should conform to EN 347.

The choice of safety footwear should first be made on the basis of the protection required, but comfort is a significant issue and should not be ignored. Care should be taken in the choice of anti-static and conductive footwear. Both give protection against the hazard of static electricity and anti-static footwear also gives some protection against electric shock. However conductive footwear provides no protection against electric shock and must not be used where this is a risk.

Footwear should be checked for wear or damage and replaced if necessary.

### **4. Gloves**

Gloves may be used to give protection against toxic or corrosive chemicals, microbiological or radiological contamination, cuts and abrasions, impact, vibration or extremes of heat and cold.

Standards for protective gloves are complex and basic standards are listed below. Gloves may additionally be described as of simple, intermediate, or complex design (a measure of their suitability for risks ranging from minimal to high); a performance level (usually on a scale from 0 to 4) may also be quoted.

a) EN 407 for protection against heat and/or fire

b) EN 421 for protection against ionizing radiation/radiation contamination

c) EN 659 for protection against heat and flames

Choose gloves appropriate for the job and consider whether long cuffs, gauntlets, or sleeve protectors may be required. Ensure that they offer good fit, comfort, and dexterity.

Gloves rarely provide complete protection against hazards and this protection is much diminished by wear,

damage, and chemical contamination. They should be checked before wear for cuts or pinholes and replaced if necessary.

### 5. Protective Clothing

Protective clothing should be maintained as specified by the manufacturer.





Welder equipped with personal protection equipment.

In addition to the general protective clothing for welding and cutting operations, arc welding requires the following extra clothing:

Wear clothes made of materials heavy enough to protect against ultraviolet rays.

Wear dry welder's gloves to protect against shock and electrocution.

### **Noise hazards.**

Noise is usually defined as undesirable sound and is a health hazard. Noise can cause hearing damage. Disturbing noise levels in combination with requisite ear defenders can make it difficult to communicate, which may lower the level of enjoyment in the workplace. Psychological well-being is also affected by noise.

#### Noise abatement

Sources of noise in a welding workshop are grinding, slagging and beating. This kind of work must be minimized. When grinding or hammering must be performed the use of equipment and aids that give the lowest possible noise levels is requested.

#### Clang dampers

It is the workpiece that generates most noise during grinding, slagging and beating. Using clang dampers will reduce the noise level considerably. Clang dampers are elastic dampers with a magnetic layer for fastening on the workpiece.

#### Silenced machines

Quieter hand-held machines have been developed during the last few years. Pneumatic slag picks and grinding

machines are now fitted with silencers. Quieter grinding discs have been developed. Using modern equipment will reduce the noise level considerably.

#### Noise absorbing screens

Screens made of porous material such as mineral wool erected between the welding areas can limit the noise in many cases. The screen must be high and wide and located as close as possible to the source of the noise. By erecting absorbers above and beside the screen, noise can be reduced at longer distances.

#### Ear defenders

In many welding shops the noise level is so high that ear defenders must always be used. Wearing ear defenders of down or earplugs will provide basic protection against background noise and unexpected sound. The noise level when slagging and beating is so high that ear cups are required. It is essential to wear ear defenders all the time in extremely noisy environments. Even short periods without protection can risk damaging your hearing. A hearing impairment cannot be cured.



### **Resume: Noise of 85 db (A) or higher might lead to hearing damage**

#### Safety measures:

- noisy techniques to be substituted by quieter ones
- protection from sound waves - isolation
- spatial division
- marking noisy areas
- personal safety equipment (ear phones)
- medical prevention and ambulance

If the 85 db (A) level is reached - one must possess personal hearing protection equipment

Above the level >90 db (A), standard noise protection is required for all employees.