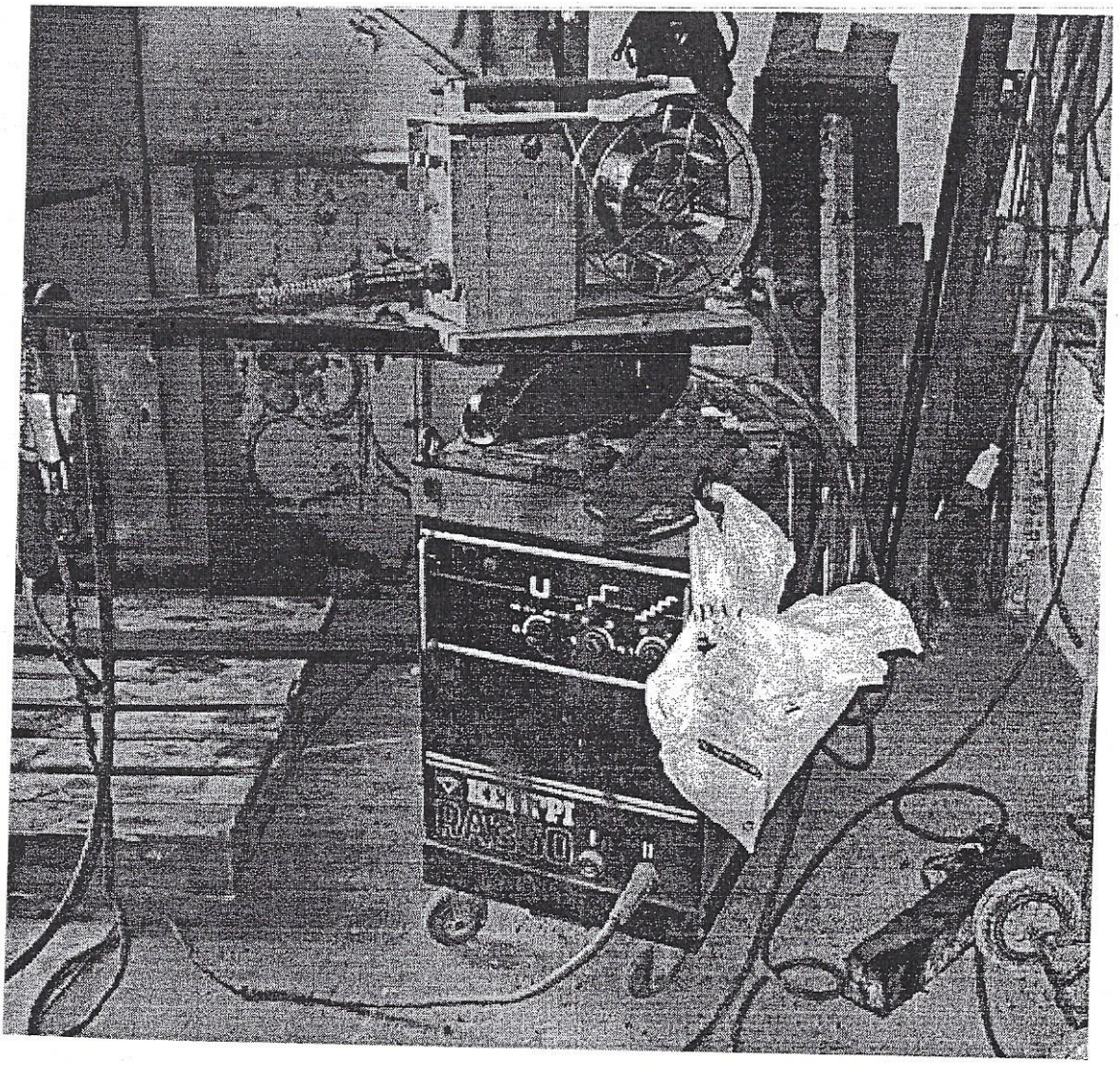
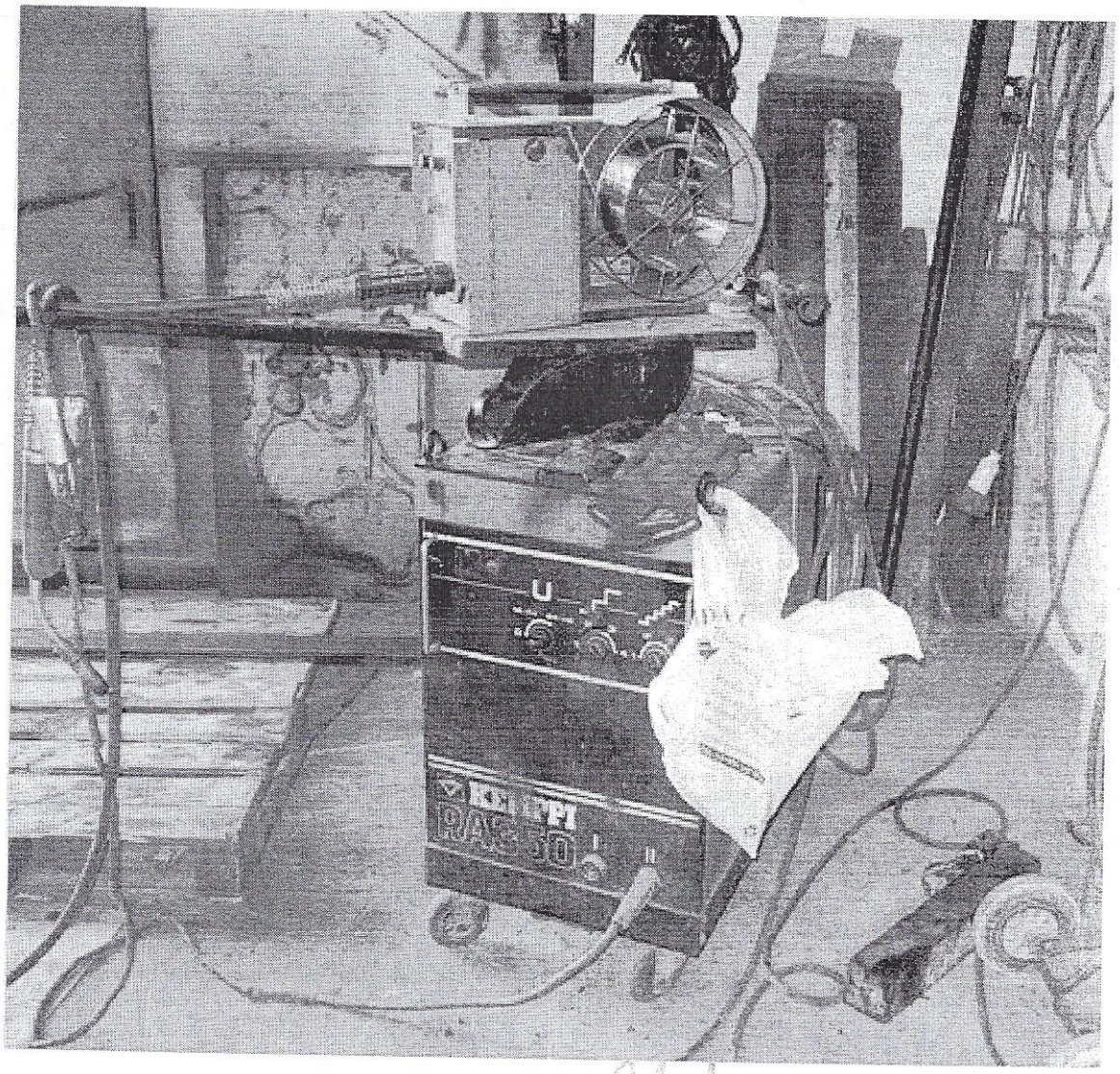
# Electric Welder



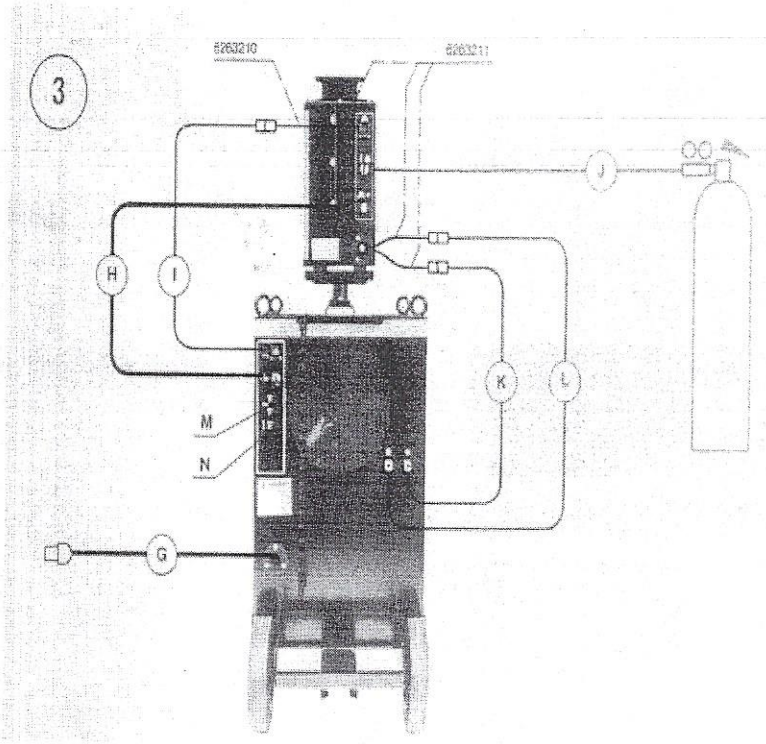
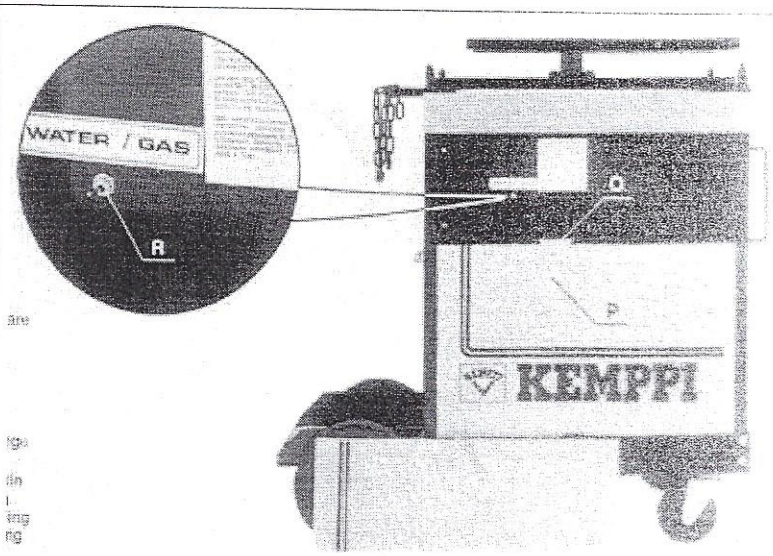
KEMPPI RA350

# Electric Welder




→ To be completed.

# Operating instructions

| Tasks | Description | Picture |
|---|---|---|
| **Connection** | **Check the good connections:**<br>**G: Mains cable**<br>**H: Welding current cable**<br>**I: Control cable**<br>**J: Gas hose**<br>**K: Water hose, hot**<br>**L: Water hose, cold**<br>**M: Fuses for manoeuvring voltage of wire feeder, 2*8A**<br>**N: Fuse for fan, 2A** |  |
| **Built in water cooling circulation unit** | With the switch located beside the water tank inside RA350W, you can select either the water-cooled or gas cooled welding method. In the water position the water cooling circulation unit starts when the power source is switched and the black push-button on the front wall of the machine is depressed. When putting the machine into service the switch must be pressed for approx. 5 seconds because the equipment is protected against the dry operation with a pressure switch on the pressure side. **DO NOT PRESS THE SWITCH WHEN THE TANK IS EMPTY**. The pilot lamp above |  <br>O: Filling gate for water tank<br>P: Control gate for liquid level<br>R: Selecting switch for water/gas cooling |

the push-button shows when the water cooling circulation unit is switched on. To stop the water cooling circulation unit, press the red push-button below the start push-button or turn the main switch of the machine to position 'zero'. The pump of the motor is overload protected with a thermostat, which controls the welding current and the voltage of the pump.

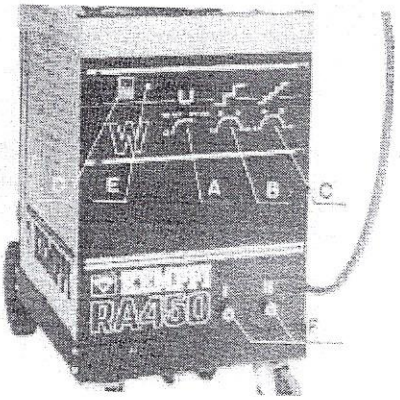
The water tank must be filled with 40% antifreeze according to the British Standard B3151. **DO NOT USE THE EQUIPMENT WITHOUT ANY COOLING LIQUID!**

The side plate of the machine has an inspection hole for observing the liquid level.

**Welding voltage adjustment**

**A : Main switch/Selecting switch of voltage range**
**B: Voltage regulation switch, coarse regulation**
**C: Voltage regulation switch, fine regulation**
**D: Start switch for water equipment**
**E: Pilot lamp for water equipment**
**F: Earth cable connectors**

Voltage adjustment is divided into two ranges, which are marked on the main switch. Inside the ranges the voltage is adjusted with a 4-step coarse and fine adjustment switch. Open circuit voltages are as the picture beside : DO NOT ADJUST THE VOLTAGE DURING THE WELDING




| | | RA 350 | |
|---|---|---|---|
| Coarse | Fine | Small range | Wide range |
| 1 | 1—4 | 14,0—15,3 | 24,6—26,9 |
| 2 | 1—4 | 15,8—17,4 | 27,8—30,1 |
| 3 | 1—4 | 18,0—20,1 | 31,7—35,3 |
| 4 | 1—4 | 21,0—23,9 | 36,7—41,9 |

# HEALTH & SAFETY

**HAVE TO BE WORN TO USE THIS MACHINE :**

Dust mask Welding mask Safety footwear Gloves Protective clothing

Carry out the maintenance as mentioned in the manual's instructions.

**In case of accident** or of a discovery of someone in difficulty:

- Contact Green Skip : **21422009** (from inside of the company : 111)
- In case of absence: 21422010/21422017

1) Call the emergency general number typing the number **112** or for the ambulance 196.

2) Give the address of the place: **GREEN SKIP GROUP SERVICES LTD, Ta' I imriekeb, Ramla road, Maghtab-Naxxar, NXR 6540, MALTA,** explaining the entrance and the floor of the building where the people to save are.

3) Go to welcome the emergency services at the address you told them.

# SAFETY INSTRUCTIONS :

## Regulations relating to welding fume

The Management of Health and Safety at Work Regulations 1999 require that employers assess the risks to health of employees arising from their work. The actions arising from the risk assessment are dictated by other more detailed regulations, which in the case of welding fume are the Control of Substances Hazardous to Health (COSHH) Regulations 2002 .

Hazards to health from welding fume arise from inhalation of the fumes. A risk assessment involves estimating the exposure of workers to the fume and considering the steps required to control that exposure, if prevention is not reasonably practicable. The limits to which welding fume and its component parts must be controlled are provided in Guidance Note EH40 'Occupational Exposure Limits ' available from the Health and Safety Executive. The list is updated annually. Most of the limits listed are for single substances and only a few limits relate to substances which are complex mixtures. Welding fume is one of these. Therefore, welding fume as a mixture has an occupational exposure limit, but account must also be taken of the exposure limits of the individual fume constituents. This means that not only should exposure to welding fume be controlled within the limit set by the welding fume exposure standard, but that the individual fume components must also be controlled within their own limits.

Substances may have either a maximum exposure limit (MEL) or an occupational exposure standard (OES).

A MEL is the maximum concentration of an airborne substance, averaged over a referenced period, to which people may be exposed under any circumstances. Exposure should be reduced as far as is reasonably practicable and at least as low as the MEL. To assess the reasonable practicability of reducing exposure, the nature of the risk has to be balanced against the cost and effort involved in taking measures to reduce the risk. Hexavalent chromium and nickel compounds are examples of substances occurring in welding fume which have MELs.

An OES is the concentration of an airborne substance, averaged over a reference period, at which, according to current information, there is no evidence that it is likely to cause harm to people's health if they are exposed day after day. Control will be thought to be adequate if exposure is reduced to or below the standard.

The effects of exposure to substances hazardous to health vary depending upon the nature of the substance and the exposure. Some effects result from prolonged or accumulated exposure and the long-term (eight hour time weighted average) exposure limit is intended for control of this type of substance by restricting the total inhalation over one or more workshifts. Other effects may be seen after brief exposures and short-term (15 minute) exposure limits are applicable. Short-term limits may also be applied to restrict the magnitude of excursions above any long-term limit.

The Carriage, Handling, Identification and Packaging Regulations 2002 (CHIP3), require suppliers to provide information on the hazards arising from the packaging, transport,

handling, storage and use of their products. The information is provided on a Material Safety Datasheet (MSDS). Every welding consumable must have an associated MSDS which provides, amongst other things, the composition of the fume emitted when the consumable is used. Often the MSDS provides information on the occupational exposure limits of the various fume components. Frequently, the level to which the total fume must be controlled in order to maintain all the components below their respective exposure limits has been calculated.

## Risk Assessment

Evaluating the risks arising from exposure to particulate fume will involve providing correct answers to the following questions.

- How much fume are people exposed to?
- For how long are they exposed?
- What is the chance of exposure occurring?
- What are the possible adverse effects of exposure?

The answers will determine any requirements for control or for monitoring measurements to be carried out. A good assessment indicates appropriate protection against occupational disease, yet avoids the inconvenience and expense of carrying out over-elaborate precautions.

The risk assessment must be recorded and should indicate the sources of information and the factors considered by the assessor.

It must be reviewed, and, if necessary, updated if circumstances change or it becomes apparent that the original assessment is no longer valid.

The results of a risk assessment must be communicated to employees and to their representative. The safe system of work, developed from the risk assessment, should include not only what must be done, but also deal with the consequences that may arise from not following the procedure. For example, if the safe system of work shows a requirement for control measures such as ventilation or respiratory protection it will be necessary to:

- Ensure proper use of the equipment provided
- Ensure the equipment is maintained in good working order
- Ensure that workers have received appropriate information and training in use of the equipment(s).

Other possible consequences include:

- Exposure monitoring
- Health surveillance

Employees must have access to their own monitoring results and to the collective results of any health surveillance.

# Assessment of Exposure

To assess exposure it will be necessary to gather information on:

## The composition of the particulate fume

The composition of the particulate fume determines the level to which it must be controlled in order to avoid health risks. Fume containing elements with "low exposure limits" will require control to lower levels than fume where these elements are absent.

In arc welding, around 90% of the fume originates from the consumable. Therefore, the consumable is the main factor affecting composition. The parent material has only a minor effect on fume composition. Significant differences in fume composition exist for different welding processes. The fume from MMA/SMAW (manual metal arc/shielded metal arc welding) and FCAW (flux cored arc welding) contains a high proportion of compounds originating from the electrode coating or the flux core, but the fume from MIG/MAG/GMAW welding (metal inert gas/metal active gas/gas metal arc welding) is broadly similar in composition to that of the metal deposited. MMA and FCAW consumables containing chromium generate significant quantities of hexavalent chromium in the fume but MIG/MAG consumables do not. The presence of hexavalent chromium in the fume is important, because it has a much lower exposure limit than other chromium compounds. Fume-containing hexavalent chromium must be controlled to as low a level as reasonably practicable.

Surface coatings, e.g. zinc or paint, on the parent material may influence the fume composition. Although information on the composition of coatings may be available on material safety datasheets, this may not adequately reflect the composition of the fume emitted. Precautionary removal of the coating should be carried out when insufficient information is available to evaluate the risk.

Particulate fume from cutting processes is generally similar in composition to the parent material, unless surface coatings are present.

## The amount of fume generated

The factors affecting the quantity of fume generated are the process and process parameters, of which the process is the most important factor. Some processes produce large quantities of fume and others do not, irrespective of the welding parameters.

Processes where metal is transferred across an open arc produce the most fume, e.g. MMA, FCA, MIG/MAG welding. TIG/GTAW (tungsten inert gas/gas tunsten arc welding) welding does not produce particulate fume in appreciable amounts. Higher metal removal rates generally produce more particulate fume with gouging and cutting.

The effect of welding parameters is small compared to the overall effect of the process. Current and voltage are the most important factors and often the effect of other process parameters stems from the changes they confer in current and voltage. Generally higher currents and voltages equate to more fume.

### The welding position

The welding position affects the proximity of the fume to the welder's breathing zone. Welding positions which place the welder closer to, or worst of all, above the plume of fume are expected to lead to higher exposure.

### The welding location

The confinement (i.e. size and/or volume) of the workspace is expected to affect exposure. Smaller confined spaces are expected to result in higher exposures.

### The duty cycle and duration of exposure

For a given welding situation, lower duty cycles generate less fume and usually give rise to lower exposures. Similarly, if the duration of exposure is short, then lower exposures would be expected for an averaged work period.

## Measurement of Exposure to Particulate Fume

The COSHH Regulations 2002, require that, where necessary, the exposure of employees to hazardous substances is monitored in accordance with a suitable procedure. The employer must keep a suitable record of any monitoring carried out and ensure that the record or summary is kept available for inspection.

Monitoring may be required to a) gather information on exposure levels when previous data and experience are not available, b) to ensure compliance with exposure limits, c) to test the effectiveness of control measures such as extraction, d) to give a guide for the selection of respiratory protective equipment.

Welding fume exposure measurements must be performed according to standard protocols. The standard which applies is EN ISO 10882. The main difference between personal sampling during welding, and sampling during other activities, arises because a helmet is worn during welding. When a helmet is worn, sampling must be performed behind the helmet, to provide a true indication of the quantity of fume breathed. Measurements may also be carried out at pre-selected points in the workshop. These are known as fixed point measurements. While, fixed point measurements do not measure personal exposure, they can be useful in estimating the amount of fume breathed by other workers in the area. They may also be useful in identifying failures of control measures.

Records from monitoring should be readily retrievable for inspection and should be in an easily understood form. The results of personal sampling must be kept by the employer for at least 40 years and for at least five years in all other cases.

## Fume Control

To control exposure to welding fume it is necessary to consider an hierarchy of actions to be taken:

- Can exposure be prevented?

- Can exposure be controlled using methods other than respiratory protective equipment (RPE)?
- What sort of RPE is required if control of exposure cannot be achieved by other methods?

The scope for reducing the quantity of fumes emitted, or for modifying their composition through consumable formulation or by changing welding parameters is extremely limited. When fume control is required it usually takes the form of engineering control and, in particular, ventilation. Although general ventilation can help to control exposure by reducing background levels of fume, it is usually ineffective for the control of welder exposure and may lead to expensive environmental heat loss. Consequently, ventilation which removes fume at source, commonly known as local exhaust ventilation, is the recommended method of fume control in the welding industry. Extracting the fume at source protects not only the welder, but also other workers, by preventing the fume from entering the general workshop atmosphere. There are four main methods of controlling exposure by removing fume at source. These are a) adjustable extract hoods, b) extracted benches, c) extracted booths, d) extraction equipment fitted directly to the welding gun.

If ventilation control measures are used it will be necessary to ensure that they are properly maintained by initiating a suitable management system. Such a system must ensure that control measures continue to be effective and that they are used properly. If circumstances change, then re-assessment of the risks to health will be required.

Respiratory protective equipment, known as RPE, must be provided and used when welding fume cannot be adequately controlled using ventilation techniques. RPE should always be regarded as a last resort solution to an exposure problem and should be used in addition to, rather than instead of, other control measures.

RPE is broadly grouped into two classes; respirators and air supplied equipment.

Respirator equipment includes disposable respirators, powered respirators and face masks with filters. They take in contaminated air and filter or clean it before it is inhaled.

Air supplied equipment includes devices such as air-fed helmets and self-contained breathing apparatus. They deliver air from a separate source to the welder. If used, RPE should be incorporated into a formal management system so that effective controls are put in place and monitoring is undertaken regularly.

## Information, Instruction and Training

The COSHH regulations require that an employer, who undertakes work which may expose his employees to substances hazardous to health, provides information, instruction and training to allow them to know the risks to health created by the exposure and the precautions to be taken.

General duties are placed on manufacturers, importers or suppliers, under Section 6 of the Health and Safety at Work Act 1974, to provide information on the risks to health of substances which they supply. For welding fume, this information usually takes the form of a Material Safety Datasheet. Such information should be distributed by the employer

to all employees and others who need it. It is not sufficient to simply hold the information on file.

Employees or their representatives must be informed of the results of assessments and of any monitoring carried out, particularly the monitoring of substances with an MEL (e.g. nickel and hexavalent chromium compounds in fume) which has been exceeded. The collective results of any health surveillance must also be provided, but in a form which preserves the anonymity of individuals.

Employees (and other persons as appropriate) must, as described in the General COSHH Approved Code of Practice, be kept well informed in the following matters:

1. ) The nature and degree of the risks to health arising as a consequence of exposure; including factors that may influence that risk (such as the substances involved) and factors that may increase that risk (e.g. smoking).
2. ) The control measures adopted, the reasons for these, and how to use them properly.
3. ) The reasons for personal protective equipment and clothing, and the jobs where this is necessary.
4. ) The monitoring procedures, the arrangements for access to the results, and methods of notification if a MEL is exceeded.
5. ) The role of health surveillance, employees' duty to attend, the health surveillance procedures, arrangements for access to individual records and the collective results of health surveillance.

# MAINTENANCE :

## 1) Maintenance of the power source unit:

The amount of use and the working conditions should be taken into consideration in the maintenance of the RA machines. Careful use and preventive maintenance will ensure troublefree operation without unforeseeable service interruptions.

Basic maintenance should be carried out at least twice a year :

- **Clean the equipment carefully, the interior parts and components with compressed air.**
- **Inspect the condition of electrical connections and components especially the contact tips of the contractor and the relay. Clean the dirty tips.**
- **Repair the possible damages immediately.**

## 2) Maintenance of the cooling water circulation unit:

- Check daily the quantity of liquid. Change liquid if it has been boiling because it will then lose its metal protecting characteristics.
- Twice a year cooling liquid must be changed and the pipes and tank must be rinsed with pure water. Check the condition of the Pump, motor and coupling between them. Repair possible damages and clean the equipment.

**WHEN CLEANING WITH COMPRESSED AIR ALWAYS PROTECT YOUR EYES WITH PROPER GOGGLES.**

## Schedule of Maintenance:

Note down every time you use the machine and what kind of maintenance was carried out as mentioned in the manual's instructions.

| NAME/DATE | Maintenance carried done | When is the next date for the same maintenance? |
|---|---|---|
| | | |
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