

LOGO

Control approach 2/3

Control Guidance Sheet for Microelectronics Industry

Microelectronics Wet Etch Processing

Engineering Control

Mc1



This information will help employers comply with the requirements of the Control of Substances Hazardous to Health Regulations 2002 (as amended) to control exposure and protect workers' health. It is also useful for trade union and safety representatives.

This sheet applies to work involving Microelectronics Wet Etch processing. The sheet does not cover maintenance tasks.

Hazards include the use of corrosive mineral acids and flammable solvents. Exposure to corrosive materials can cause respiratory tract irritation. Exposure to solvents can cause narcosis.

Check the supplier's safety data sheet. Write down what you will do in an emergency.

For environmental advice, see 'Environmental guidelines' in Mc0.

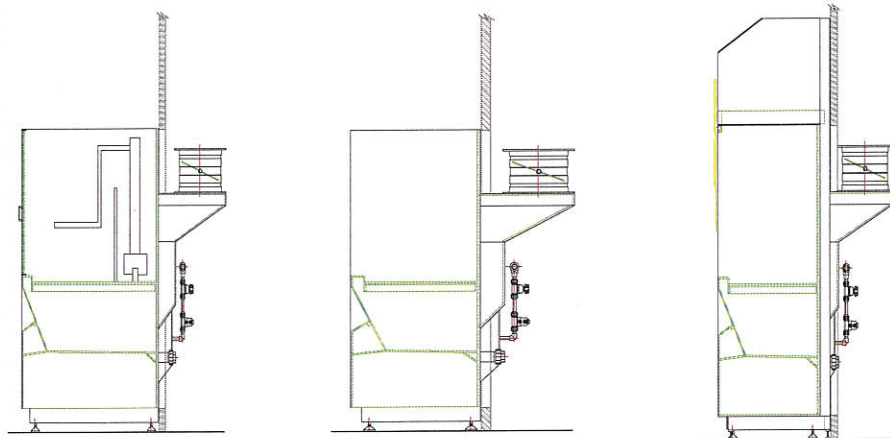
Access

- ✓ Restrict access to authorised staff
- ✓ Keep the workplace exit routes clear
- ✓ Label the work area, pipe work and equipment clearly

Design and Equipment

Containment (control approach 3) is recommended where possible. Otherwise, local exhaust ventilation - an extracted booth (control approach 2 – see Mc0) may be used.

- ✓ In general, wet benches used within the microelectronics industry fall into three main categories:



Category 2
Total Enclosure

Partial Enclosure

Laminar Flow

- ✓ Can you use less hazardous products, or eliminate the process?
- ✓ Benches and tanks should be manufactured from materials that are compatible with the chemicals being used eg: steel for solvent and fire retardant plastic otherwise
- ✓ For extracted booths with no laminar flow, the airflow at the opening should be at least 0.5 metres per second.
- ✓ For extracted booths with vertical laminar flow, check the air-flow patterns within the bench by using "smoke tubes" or tracer gas. Air-flow meters are unsuitable.
- ✓ Provide an easy way of checking the equipment is working eg: manometer or pressure gauge attached to the extraction duct. This should be linked to a visual or audible warning alarm.
- ✓ Keep extraction ducts short with few bends. Avoid long sections of flexible ductwork. Use ductwork material that is compatible with the chemicals being used.
- ✓ Discharge cleaned, extracted air to a safe place away from windows, doors and air inlets.
- ✓ Provide good lighting which should be suitable for the chemicals and tasks eg: flameproof for solvent benches
- ✓ Dispose of used process chemicals via suitable drainage systems for solvent and non-solvents. Can you use dump valves or aspirators to avoid contact with the chemical?

- ✓ Avoid storing items in the enclosure. These may block the extraction. Don't store chemicals beneath the bench.

Examination and Testing

- ✓ Test the control equipment regularly (see sheet **Mc0** for details of thorough examination and testing.
Noisy or vibrating fans can be indicating a problem.
- ✓ At least once a week, check that the extraction system is working properly.
- ✓ You need to know the design performance to know if extraction is working properly. The supplier's literature should give this information.

Cleaning and Housekeeping

- ✓ Ensure workplace remains clean. Clean plant and equipment in accordance with manufacturers' schedule and procedures.
- ✓ Put contaminated gloves and overalls (any personal protective equipment) in the correct bin for hazardous waste. This waste needs disposal by specialist waste companies.
- ✓ Ensure that incompatible wastes are not mixed.
- ✓ Ensure all containers are lidded and labelled.

Personal Protective Equipment (PPE)

- ✓ See sheet **Mc0**.
- ✓ Workers also need eye protection, protective goggles, impervious apron and protective footwear
- ✓ Provide storage for PPE to prevent damage or contamination when not in use.
- ✓ Skin creams help in washing contamination from the skin. After-work creams help to replace skin oils

Training

- ✓ See sheet **Mc0**.
- ✓ Include managers and supervisors in health and safety training

Additional Guidance

- ✓ If skin problems appear you should consult an Occupational Health Professional
- ✓ You may decide to have air monitoring done to make sure the controls are adequate. See COSHH Essentials sheet **G409**
- ✓ For general information on PPE, cleaning, housekeeping and maintenance, please see sheet **Mc0**.

Further Information

- General ventilation in the workplace HSG202 HSE Books 2000 ISBN 0 7176 1793 9
- An introduction to local exhaust ventilation HSG37 HSE Books 1993 ISBN 0 7176 1001 2
- Maintenance, examination and testing of local exhaust ventilation HSG54 HSE Books 1998 ISBN 00 7176 1485 9
- HSG 53 Respiratory Protective Equipment at Work: A Practical Guide. ISBN 071762904
- SSA Safety features of Chemical Workstations ISBN 1872780024
- INDG 273 Working with Solvents
- INDG Hydrofluoric acid poisoning
- SEMI S3-91 – Safety guidelines for heated chemical baths
- Semi S2 Safety guidelines for Semiconductor Manufacture Equipment
- COSHH: A brief guide to the regulations.
<http://www.hse.gov.uk/pubns/indg136.pdf>

Employee checklist

- Are the engineering controls and extraction systems working properly?**
- Is the equipment in good condition and working properly?**
- Make sure you know what to do if there is a leak or spill.**
- Make sure you have the right PPE for the job you are doing, that it's in good condition and that you use and store it properly**
- Do not use gloves that are punctured, split, cracked or otherwise damaged**
- If you find a problem, tell your supervisor. Don't just carry on working**
- Don't smoke in the work area**
- Wash your hands before and after eating, drinking, smoking and using the lavatory.**
- Check your skin regularly for dryness or soreness – tell your supervisor if these appear**