MICRONOVA
Centre for Micro- and Nanotechnology

VTT

Aalto University

# Chemical Waste in Micronova

Liquid waste
Solid waste
Powdery solid chemical waste
Silicon wafer waste
Metal waste
Mercury waste

# Handling of waste chemicals

- The persons in charge of waste chemicals are Paula Kettula (Aalto) and Jaana Marles (VTT)
- Jarmo Määttä (VTT) handles the waste chemicals delivered to the waste chemical collection point and marks them in a registry
- Transportation of waste chemicals occurs once a year (December) to EKOKEM
- Instructions of collection of waste chemicals is in LIMS/Info/General documents

# Chemical Drains

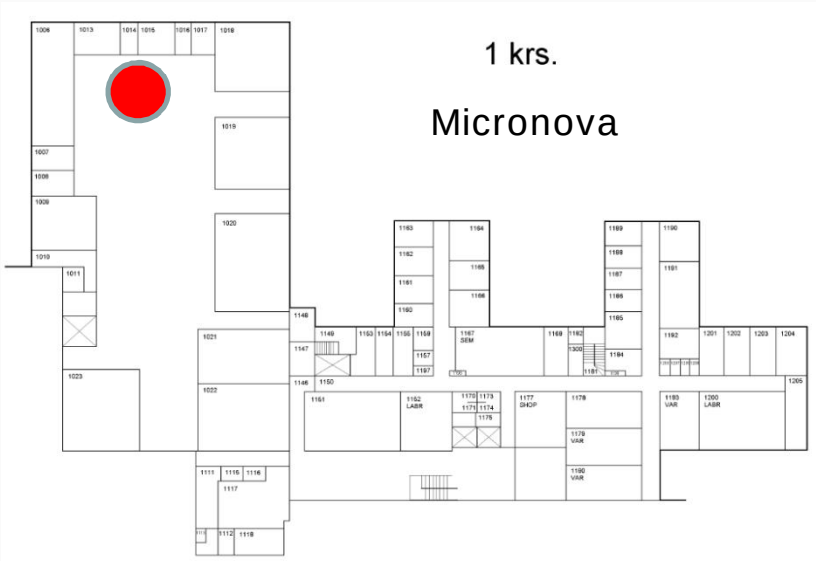
- A lot of chemicals are handled at Micronova. After use all chemicals turn into waste.
- Chemical drainage systems have been built in the cleanroom and Subtech laboratories for collecting these wastes:
  - Neutralization
  - HF Drain for fluoride waste (only in cleanroom)
  - Solvent drain
  - (Drain for PosiStrip, only in M1 VTT)
  - (Drain for photoresist waste, M1 and M2 VTT)
- If a forbidden chemical ends up in any of these drains, the Nanofab person on-call must be informed immediately.
- The temperature of the solutions led into the drains must not exceed +50°C

# Chemical Drains

| Name of drain | Location | Permitted chemicals | Forbidden Chemicals | Destination |
|---|---|---|---|---|
| Hydrofluoric acid (HF) | M1 Cleanroom<br>M2 Cleanroom | • Hydrofluoric acid (HF) Ammonium fluoride (NH4F) water solutions,<br>• HF or NH4F based etch mixtures,<br>• HF and nitric acid (HNO3) mixtures | • solvents | The waste is led to a collection container. |
| Neutralisation | M1 Cleanroom<br>M2 Cleanroom<br>Subtech laboratories | • All inorganic acids (other than fluorides) and their mixtures like ”Piranha”, RCA1 and RCA2, acetic acid, nitric acid etc<br>• All bases. | • solvents<br>• solutions containing HF<br>• solutions containing heavy metals<br>• Solutions containing Fluorine | The waste is led to a neutralisation container where it is neutralised and later led to the normal city sewage system |
| Solvent | M1 Cleanroom<br>M2 Cleanroom<br>Subtech laboratories | • Acetone, IPA, MIBK, PGMEA, methanol, ethanol | • All acids and bases<br>• **chlorinated hydrocarbons**<br>• **toluene, xylene** | The waste is led to a collection container |
| PosiStrip | M1 Cleanroom | • PosiStrip | • All other chemicals | The waste is led to a collection container |

# COLLECTION OF WASTE CHEMICALS IN CONTAINERS

- In the cleanroom and all the laboratories at Micronova, chlorinated hydrocarbons and other toxic organic solvents are collected into separate containers.
- The waste chemical containers are marked and stored in the chemical storage cabinets.
- Full waste containers are taken through the chemical waste collection point to the chemical storage room to await transport to the hazardous waste disposal plant.

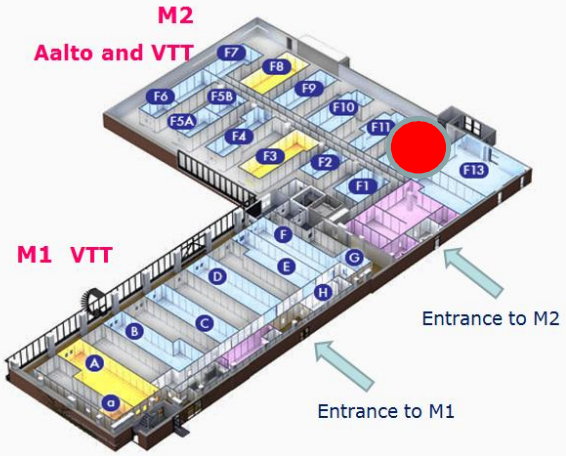



Collection point in Subfab
**M2 technical facilities**

# COLLECTION OF LIQUID WASTE CHEMICALS IN CONTAINERS

## Aalto M2 cleanroom
## Waste chemical collection point

- In Chemical Storage Cabinets 2F12 02 and 2F12 03 the lowest shelves are arranged for the waste chemical point.
- This is for the chemicals you need to collect in bottles (for example acids containing heavy metals, solvents like chlorinated hydrocarbons, toluene, xylene).
- Full waste bottles are collected from the cabinets by Nanofab's personnel and delivered to the appropriate facility for disposal.




# Marking waste containers

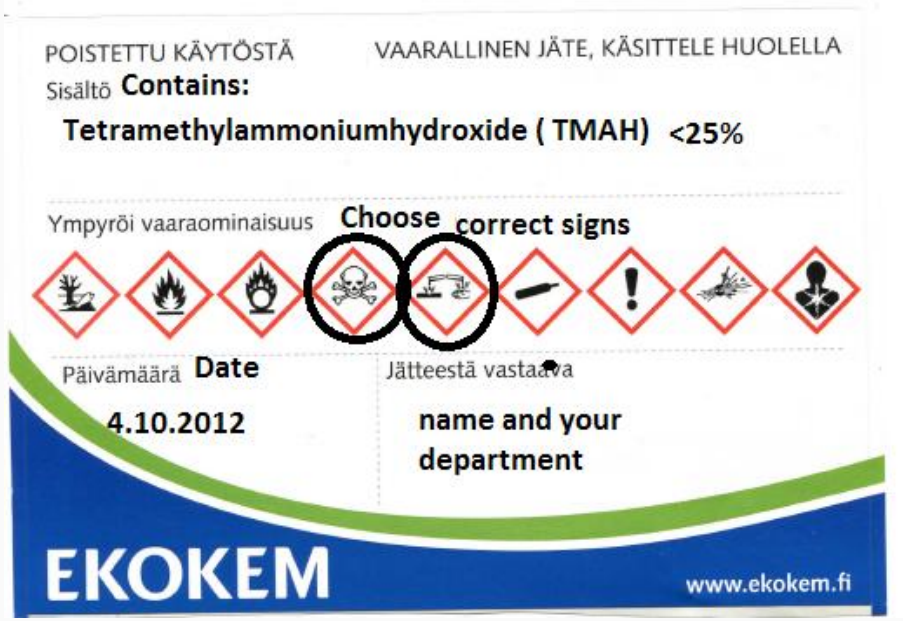
## In Aalto M2 cleanroom

- Mark waste bottles with the word WASTE and toxicity with chemical labels (label stickers are on F12 shelve).
- Waste chemicals are kept in F12 chemical storage cabinet's lowest shelves.
- Aalto Nanofab personnel remove the waste from the cleanroom and label them for the hazardous waste disposal plant (EKOKEM).

## Subfab and office laboratories

- Mark the containers with the word WASTE. Use ready printed stickers (EKOKEM) available from the waste chemical point next to the waste chemical storeroom.
- All the chemicals in the container should be named on the sticker.
- If the chemical waste is in its own original container, with the original chemical markings on, it is enough to add the word WASTE to the container.

# Waste chemical label

# Office laboratories

| Type of waste | Contents | Handling |
|---|---|---|
| **Hydrofluoric acid waste** | Hydrofluoric acid (HF) and Ammonium fluoride (NH4F) water solutions<br>HF or NH4F based etch mixtures<br>HF and nitric acid mixtures | Deliver to waste chemical point in M2 technical facilities |
| **Inorganic acid waste**<br>**Content must be listed** | Inorganic acids (including acetic acid) that do not contain hydrofluoric acid or its derivatives | Deliver to waste chemical point in M2 technical facilities |
| **Inorganic base waste**<br>**Content must be listed** | Inorganic bases like ammonium hydroxide, KOH, NaOH and TMAH | Deliver to waste chemical point in M2 technical facilities |
| **Acetone and IPA waste** | Acetone and IPA (=isopropanol, 2-propanol) | Deliver to waste chemical point in M2 technical facilities |
| **Solvent waste**<br><br>**Content must be listed** | All other organic solvents except IPA and Acetone e.g. toluene, trichloroethylene, xylene | Deliver to waste chemical point in M2 technical facilities |
| **Oil waste** | Pump oils etc | Deliver to oil waste point in M1 technical facilities and container is emptied into oil waste barrel |
| **Glycol waste** | Coolant | Deliver to oil waste point in M1 technical facilities |

# Solid and Mercury waste

## Powdery solid chemicals

- Are stored in their original packaging, which are marked with the word WASTE

## Silicon wafers

- Aalto M2 cleanroom silicon wafer rubbish bin is in the service area near printer.
- Subfab and office laboratories use waste collection point for wafer waste

## Metals

- Are wrapped up and marked with information about contents and the word WASTE. For example: LEAD WASTE

## Mercury waste

- In the laboratories the mercury waste is usually from broken mercury thermometers, and from the lamps in the mask aligner.
- Broken thermometers are packed into a container or plastic bag that is closed so that the mercury can’t evaporate into the surroundings, and is marked with MERCURY WASTE.
- Mask aligner lamps are preferably stored in their original packaging, which are marked MERCURY WASTE.

# Laboratory glass waste

## All laboratory glass

- like pipettes, broken laboratory dishes and glass ware that cannot be rinsed, is collected in an appropriate plastic container.
- There is a rubbish bin for glass waste in Aalto M2 cleanroom service area.
- Subfab and office laboratories bring glass waste to waste collection point, marked with LABORATORY GLASS WASTE
- Never put glass waste or other sharp objects into a normal cleanroom trash container – danger of cuts for people handling the trash!
- Solid waste is delivered to the waste chemical collection point.