ILO Toolkit Control Sheet E100 Control of emissions into the air
Chemicals that can Cause Harm to the Environment

Scope

This control sheet is part of the ILO Chemical Control Toolkit. It provides general advice on the control of chemical emissions into the air. It describes the key points you need to follow to provide adequate control and ensure that environmental exposure is reduced to acceptable levels. Other sheets in this E series provide guidance on emissions into water, and as wastes. Your local authority or environment control authority will have limits for environmental emissions to air. Ask them for details. Some chemicals and products are flammable, corrosive or toxic to humans as well as harming the environment, so exposure of humans via the environment needs control.

Emissions into the air and their control

- Substances requiring control include:
    - acid and alkali fumes (corrosive mists)
    - smoke
    - dust and fume
    - solvent vapours
- The degree of control needed is a matter for local regulation. Emission limits differ from occupational exposure limits.
- Emission limits set boundaries for the quantity of pollutant emitted, the concentration emitted, and/or the duration of the emission per day.

Control of corrosive mists

- Corrosive mists arise from processes that emit acid or alkali vapours. These can be arrested in wet scrubbers and spray towers. However, the scrubber or spray fluid will become a waste material, and needs to be disposed safely.

Control of smoke

- Smoke results from incomplete burning, when it can contain harmful pollutants such as sulphur dioxide, oxides of nitrogen, Polycyclic Aromatic Hydrocarbons (PAH) and dioxins. Emission of dark or black smoke shows an urgent need to improve the combustion process.

Control of dust and fume

- Dust results from a very wide range of processes, and in a range of particle sizes from grit (around 100 microns) to dust (above 1 micron). Fume is solid condensed vapour, and can be taken as particles below 5 microns. Depending on the particle size and corrosive properties of the dust, and its potential for harm to the environment, there is a range of air cleaners available:

Air Cleaner	Efficiency	Particle Type
cyclone	about 85%	coarser particles
electrostatic precipitator	about 95%	fine particles only
wet scrubber	about 98%	all particles
fabric bag filter	about 99%	all particles

- All of these require power to run, and vigilance to make sure they remain working properly.
- The collected waste dust or liquid sludge will need special considerations for disposal. The people emptying dust collectors and sludge pits will require personal protective equipment.

Control of solvent vapours (volatile organic compounds, VOC)

- Solvent vapours result from coating and drying processes, and from making large fibreglass structures. Spray towers, using water with a surfactant, will remove soluble and reactive vapours. Adsorbers, such as charcoal towers, can be useful, but have a limited life and the exhausted charcoal needs disposal. Another method is combustion, where the vapour passes into an incinerator or over a heated catalyst bed.

Typical control systems

- Common processes have range of typical air cleaning devices as follows:

Dust Type	Air Cleaning Device
Ceramic dust	cyclone, bag filter, wet scrubber
Chemical dust	cyclone, bag filter
Food and drugs	wet scrubber, bag filter
Fly ash	bag filter, electrostatic precipitator
Foundry dust and fume	wet scrubber, bag filter
Grain handling	cyclone, bag filter
Metal smelting	wet scrubber, bag filter
Mineral handling	bag filter (cement), wet scrubber
Mineral dryers	electrostatic precipitator

Metal working	cyclone, bag filter, wet scrubber
Plastics, wood dust	cyclone, bag filter
Rubber	bag filter, wet scrubber

General precautions

- Check the emission stack from time to time, to make sure it is working
- Monitor the pressure drop across air cleaners, to check they are working efficiently
- Prepare a schedule for maintaining the air cleaners – and keep to it
- Dispose of dust and sludge as special waste
- Do not dump waste except in a specified tip.
- Check with your local environment authority how to classify the collected waste for disposal.
- Make sure the waste is clearly labelled and disposed through an authorised waste contractor
- Dust is harmful to health – use a respirator
- Sludge may be corrosive or poisonous – wear protective equipment and wash it off your skin - you may need to shower after unloading a dust or sludge collector.