



AOC&MMD

Manufacturing Process Chemicals Management Guidelines

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1 Purpose and Objective



AOC&MMD is committed to identifying, managing, and progressively eliminating High Priority Process Chemicals (HPPCs) across all manufacturing facilities involved in the production. This guideline reflects AOC&MMD corporate sustainability strategy to protect worker health, minimize environmental impact, and drive green manufacturing innovation.

2 Definitions

Substance:

a chemical element and its compounds in the natural state or obtained by any manufacturing process, including any additive necessary to preserve its stability and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition.

Manufacturing Processes:

Any activity that contributes to the manufacture and/or equipment operation and maintenance related to the manufacture of a product. Manufacturing processes are inclusive of assembly and disassembly, fabrication and production, cleaning and maintenance, and quality assurance and control processes.

Process Chemicals:

Chemicals (individual substances or mixtures) used during the manufacture and/or finishing of a product and/or operation and maintenance of related production equipment that are not intentionally added or incorporated into a product.

3 Scope

The guidelines apply to all AOC&MMD -owned manufacturing facilities and supplier facilities involved in the production of electronic products, including component manufacturing and final assembly.

The guidelines shall be followed in conjunction with:

- OBM Substances Requirements
- The Clean Electronics Production Network (CEPN) Process Chemical Data Collection (PCDC) Tool.
- The Responsible Business Alliance (RBA) Code of Conduct and Industry Focus Process Chemical (IFPC) Policy.
- Applicable local, national, and international regulations.

All facilities are required to adhere to the guidelines and provide documentation to demonstrate compliance.

4 Process to Collect and Identify Process Chemicals

4.1. Process Chemical Data Collection

The facilities should maintain up-to-date and accurate inventory records of all process chemicals that are known or suspected to be used in the relevant manufacturing processes. AOC&MMD will conduct an inventory of facilities' process chemicals annually. The data collection method or tool shall include the following information:

- Name and Chemical Abstracts Service Registry Number (CAS RN) of each chemical ingredient in the process chemical product. Confidential Business Information (CBI) may be disguised using a structurally descriptive generic name (e.g., aromatic amine, brominated aryl compound) as a nonconfidential substitute for chemical name and CAS and shall include UN GHS hazard characteristics information.
- Process chemical product used (name and manufacturer), or a proxy name and manufacturer may be used when needed to comply with regulatory restrictions (e.g., subject to export control or anti-terrorism laws).
- Use and controls, including process chemical product application method, enclosure type, ventilation or other engineering controls personal protective equipment (PPE), number of workers handling the process chemical product.
- Volumes or weight of the process chemical product used annually.

- Processes where process chemicals are used, such as parts cleaning, machine maintenance, etc.

The guidelines recommend using the Clean Electronics Production Network (CEPN) Process Chemicals Data Collection (PCDC) Tool as the primary method for collecting comprehensive substance-level data on all process chemicals used in production.

With review of submission by comparing that data to relevant academic literature, information obtained through industry partnerships, and any relevant legislative documents for completeness and accuracy, the identification of missing data or inconsistencies will trigger corrective actions that may include but are not limited to the following methods:

- Direct engagement with the facility to correct data or rectify errors.
- Review of process documentation to ensure proper chemical application.

4.2. List of High Priority Process Chemicals

A Process chemical is classified as an HPPC if concentration above below table ,which includes CEPN 1st and 2nd round of Priority Chemicals

Chemical Name	CAS No.	Concentration Limit
1-Bromopropane	106-94-5	0.1%
Benzene	71-43-2	0.1%
Dichloromethane	75-09-2	0.1%
Methanol	67-56-1	0.1%
n-Hexane	110-54-3	0.1%
N-Methyl-Pyrrolidone (NMP)	872-50-4	0.1%
Tetrachloroethylene	127-18-4	0.1%
Toluene	108-88-3	0.1%
Trichloroethylene	79-01-6	0.1%

Cumene	98-82-8	0.1%
1,2-Dichloroethane	107-06-2	0.1%
Diethylene Glycol Dimethyl Ether	111-96-6	0.1%
Dimethylformamide	68-12-2	0.1%
2-Ethoxyethanol	110-80-5	0.1%
2-Ethoxyethyl Acetate	111-15-9	0.1%
Ethylbenzene	100-41-4	0.1%
2-Methoxyethanol	109-86-4	0.1%
Methyl Isobutyl Ketone	108-10-1	0.1%
Nitromethane	75-52-5	0.1%
Pentachloroethane	76-01-7	0.1%
1,1,1,2-Tetrachloroethane	630-20-6	0.1%
1,1,2,2-Tetrachloroethane	79-34-5	1%
Tetrahydrofurfuryl Alcohol	97-99-4	0.1%
Trichloromethane	67-66-3	0.1%
Xylenes	1330-20-7	0.1%

*Reference : <https://cleanelectronicsproduction.org/tools-resources/priority-chemicals>

4.3. Process Chemical Exposure Control Requirements

Based on the List of High Priority Process Chemicals, facilities shall adhere to the hierarchy of controls to prevent and mitigate the potential for exposure to health and safety hazards from process chemicals:

1. Elimination and Substitution:

Prioritize the removal or replacement of high hazard process chemicals with safer alternatives. Process chemicals particularly that contain HPPCs must be prioritized



for elimination and substitution as higher, more effective levels of the hierarchy of controls (see Section 5).

2. Engineering Controls:

Where elimination is not immediately feasible, implement engineering controls (e.g., ventilation systems, containment, closed-loop processes) to adequately prevent and mitigate worker exposure. Exposure levels must be maintained below regulatory Occupational Exposure Limits (OELs).

3. Administrative Controls and Personal Protective Equipment (PPE):

These are considered temporary measures until more effective controls are implemented and may not be solely relied upon to mitigate exposures below OELs. Besides, Facilities shall provide suitable and well-maintained Personal Protective Equipment (PPE) and appropriate training for the effective and consistent use of PPE prior to worker exposure and regularly thereafter.

5 Process to Eliminate High Priority Process Chemicals

5.1. Elimination Timeline and Plan

The removal or replacement of HPPCs with safer alternatives is the highest priority. Any substitute must be selected through a traceable decision process that demonstrates:

- A reduction in potential risk to human health and the environment.
- Conformance to

AOC &MMD requires that each HPPC should be eliminated from all applicable manufacturing processes within 3 years. Each facility using an identified HPPC must develop and implement a documented elimination plan, which shall include:

- A timeline for elimination.
- Evaluation of safer alternatives.
- Steps for substitution and process modification.



Suppliers may request guidance from AOC&MMD on alternative substances and the assessment methodology.

5.2. Conditional Use Extension

The use of a high priority process chemical is permitted for up to five (5) years for those uses for which the manufacturer has, after reasonable efforts and appropriate consultation with stakeholders, been unable to identify a functionally equivalent safer alternative.

To qualify for an extension:

- AOC&MMD will engage in a multi-stakeholder collaboration to identify and test alternatives.
- The facility must document the substance's use, application, alternatives evaluation, and rationale for the unfeasibility of substitution.
- The facility must implement and maintain engineering controls to minimize worker exposure to the lowest feasible level and document alternatives evaluation, including rationale for unfeasible substitutions during the extension period.

5.3 Annual Reporting on High Priority Process Chemicals

AOC&MMD will annually report on progress toward eliminating or reducing high priority process chemicals. The report will include:

- Elimination or reduction status of substances.
- Research and development activities.
- Multi-stakeholder collaboration efforts.

The report will be published on AOC&MMD website annually.