



Lenovo

Guidelines for Manufacturing Process Chemicals Management

Version	2025-12
Document Owner	Lenovo Global Supply Chain

Table of Contents

1. Purpose and Objective
2. Definitions
3. Application of the Guidelines
4. Process to Collect and Identify Process Chemicals
 - 4.1. Process Chemical Data Collection
 - 4.2. Prioritization of Process Chemicals
 - 4.3. Process Chemical Exposure Control Requirements
5. Process to Eliminate High Priority Process Chemicals
 - 5.1. Elimination Timeline and Plan
 - 5.2. Conditional Use Extension
 - 5.3 Annual Reporting on High Priority Process Chemicals

1 Purpose and Objective

To establish a framework for the identification, management of process chemicals and elimination of high-priority process chemicals used in the manufacturing processes of Lenovo products. These guidelines aim to protect worker health and safety, minimize environmental impacts, and align with global standards for responsible chemical management. Key objectives include:

- Protecting workers from hazardous chemical exposures.
- Reducing environmental risks associated with manufacturing processes.
- Ensure compliance with applicable regulatory and industry standards.

- Promote the identification, reduction, and elimination of high priority process chemicals (HPPCs) through a structured and transparent approach.

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. This definition is found in the EU Council Directive relating to restrictions on the marketing and use of certain dangerous substances and preparations and EU Regulation 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH). Substance includes such examples as ethanol and metals. Note: metals are included here not in the form of a part or product such as a heat sink or sheet metal cover but as a metal such as aluminum or aluminum alloy. Substance goes beyond a pure chemical compound defined by a single molecular structure. The definition of the substance includes different constituents such as impurities. Also note the word “substance” is used throughout this specification, only the “Substance” with a capital letter refers to this specific definition.

Mixture: Mixtures or solutions composed of two or more substances in which they do not react.

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. Examples of fabrication and production processes include etching, photolithography, deposition, drilling, printing, soldering, doping, casting, machining, molding, forming, encapsulating, finishing, mixing, reacting, plating, etc. Examples of quality assurance and control processes include sampling, testing, inspection, failure analysis, lab work, etc.

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. Examples of process chemicals include cleaning agents, lubricants, photo chemicals, plating agents, hydraulic fluids, heat transfer fluids, chemicals used to create specific process atmospheric environments, etching chemicals, and solvents, including volatile chemicals emitted from adhesives, inks, and coatings during manufacturing.

Cut-off Values: Globally Harmonized System of Classification and Labelling of Chemicals (GHS) cut-off values or concentration limits are minimum concentration thresholds for classified hazardous substances that are primarily used as triggers for classification of mixtures containing them as ingredients. In the context of the GHS, the terms “cut-off value” and “concentration limit” are equivalent and are meant to be used interchangeably.

3 Application of the Guidelines

The guidelines apply to all Lenovo-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:

- [Lenovo's baseline Environmental Requirements for Lenovo Products, Materials and Parts.](#)
- 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. Lenovo 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. Prioritization of Process Chemicals

The prioritization process is to assess the Process chemicals risk and identify the High Priority Process Chemicals (HPPCs) based on the Process Chemical Data Collection records in Section 4.1.

A Process chemical is classified as an HPPC which represents a high hazard to workers or the environment support by following references if it:

- Contains the substance including in [CEPN 1st and 2nd round of Priority Chemicals](#), and above the substance related GHS Cut-off Values as below list

Chemical Name	CAS No.	GHS Cut-off Value
1-Bromopropane	106-94-5	0.1%
Benzene	71-43-2	0.1%
Dichloromethane	75-09-2	0.1%
Methanol	67-56-1	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%

- Contains other substance classified by the UN GHS chemicals of concern at concentrations above GHS cut-off values.

Process chemicals identified as HPPCs are documented in the internal **High Priority Process Chemicals (HPPC) Database**, which includes the substance name, CAS number, GHS classification, and specific manufacturing application, etc.

4.3. Process Chemical Exposure Control Requirements

Based on the Prioritization of 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 Lenovo's criteria for product cost, quality, and performance.

Lenovo requires that each HPPC should be eliminated from all applicable manufacturing processes within three 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 Lenovo on alternative substances and the assessment methodology.

5.2. Conditional Use Extension

If, after reasonable efforts and consultation with stakeholders, no functionally equivalent safer alternative is identified, the use of a specific HPPC may be extended for up to **two additional years (five years total)**. To qualify for an extension:



- Lenovo 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

Lenovo 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 Lenovo's website annually.