Guidelines for Management for Manufacturing Process Chemicals

To further our commitment to safeguarding human health and safety and the environment, Dell Technologies ("Dell"), formed the Manufacturing Process Chemicals (MPC) Program to monitor, address, and mitigate risks associated with the use of chemicals in our product manufacturing process.

Application of the Guidelines

Dell issued the Guidelines for Management of MPC ("Guidelines") to address risks **associated with using chemicals in the manufacturing process.** These guidelines apply to all facilities with manufacturing operations that produce Dell-branded products, supply components, and materials incorporated into Dell branded products. The Guidelines are to be followed in addition to Dell's Chemical Use Policy, Dell's Materials Restricted for Use, the Responsible Business Alliance (RBA) Code of Conduct, the Clean Electronics Production Network's (CEPN) Toward Zero Exposure (TZE) Program, RBA's Chemical Management Leadership Program (CMLP), and RBA's Industry Focus Process Chemical Policy (IFPC) and all applicable laws that address the use of chemicals in manufacturing processes. Useful related guidelines include RBA's 'Practical Guide to Chemical Management Due Diligence in Supply Chains' and CEPN's Joint Chemical Safety Committee Guidance.

Guidelines to Managing Manufacturing Process Chemicals

To respect human rights, including worker rights, and the environment, Dell supports adopting safer and more sustainable manufacturing practices. We aim to reduce and eliminate chemical and physical hazards by supporting the development and adoption of safer alternatives. We hold our facilities and supplier facilities to the RBA Code of Conduct and CEPN's TZE program commitment requirements, which align with industry best practices.

Dell expects suppliers to maintain up-to-date and accurate chemical inventory records and a traceable chemical approval process and to thoroughly review each use of the chemical through health, safety, and environmental risk assessments. This is best facilitated through a facility-level Joint Chemical Safety Committee with equal parts worker and management committee seats. Dell factories and our suppliers are expected to maintain Joint Committees to assess, manage, mitigate, and resolve worker chemical exposure risks. CEPN advises that creating a Joint Committee can lead to strong governance systems that protect the health of workers and ensure workers are consulted, informed, and actively participating in their protection[1].

Facilities use the hierarchy of controls to identify, assess, and mitigate the potential for exposure to health and safety hazards from chemicals. When workers may be exposed to chemicals after other reasonable controls have been implemented, suppliers 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.

Suppliers must communicate and provide information to workers regarding hazardous chemical risks through industry standard protocols, such as Safety Data Sheets (SDSs), in a language that workers comprehend and in a location that is easily accessible. SDSs include, at minimum, the chemical ingredients listed by Chemical Abstracts Service Registry Number (CAS#) and the potential hazards to human health and the environment.

[1] Joint Chemical Safety Committee Guidance, Clean Electronics Production Network, February 2023, (3)

Additionally, facilities take gender-responsive measures such as ensuring pregnant women and nursing mothers are not exposed to hazardous working conditions and providing reasonable accommodations for nursing mothers[2].

Dell expects suppliers to demonstrate a traceable decision process for evaluating risks to human health and the environment and selecting the appropriate method(s) of controls before use or modification in use of all chemicals in manufacturing processes. If reasonable scientific grounds indicate that the use of the substance could pose significant environmental or human health risks, then the supplier must avoid using the substance. If potential environmental or human health risks change due to a modification in the manufacturing process, the supplier must re-evaluate the appropriate use of the chemical in the modified process. When the full extent of harm is not definitive, suppliers should take precautionary measures to safeguard the environment and human health.

Additionally, under our responsibilities as CEPN TZE Signatories, we pledge to uphold these six commitments to protect workers from harmful process chemicals in manufacturing:

- Eliminate exposure to Priority Chemicals.
- Collect process chemical data to support collective mapping across supply chains.
- Foster worker engagement and participation.
- Reach into deeper tiers.
- Verify and report to workers and the public to ensure progress toward our commitments.
- Continuously improve across all areas above.

Specification on Substances Used in Manufacturing

Dell monitors the use of manufacturing process chemicals among our facilities and supplier facilities and specifies restrictions and industry accepted use-cases on manufacturing process chemicals identified as high risk.

The Substances Restricted for Use in Manufacturing include those chemicals in the CEPN 1st and 2nd round of Priority Chemicals identified by CEPN and their technical review board. CEPN's selection process for these Priority Chemicals includes nominating a starting list of chemicals using CEPN member companies' Manufacturing Restricted Substances Lists (MRSL) as well as other publicly available MRSLs, aggregating and anonymizing data collected using CEPN's Process Chemical Data Collection (PCDC) Tool and soliciting nominations from a broad cross section of stakeholders. The nominated chemicals are then researched and screened against 1) CEPN's High Hazard Criteria; 2) use in the electronics industry as solvents in manufacturing processes; and 3) a high-level review of potential availability of safer alternatives[3].

More information on the selection and research conducted for the 1st and 2nd Rounds of Priority Chemicals can be found in the Summary of 1st Priority Chemical Selection Report, December 2019 and the Summary of 2nd Round Priority Chemical Selection Report, June 2023.[3]

Additional chemical information can be found by searching these example databases by the chemical name or CAS #:

- Chemical Hazard and Alternatives Toolbox: ChemHat (GHS-based chemical summaries in understandable, less technical terms)
- NIH National Library of Medicine's PubChem database: PubChem (more in-depth chemical toxicity profiles and information)
- European Chemicals Agency's Classification and Labelling (C&L) Inventory: C&L Inventory - ECHA (compilation of GHS chemical hazard classifications)

[2] Responsible Business Alliance Code of Conduct v.8.0, (4)

[3] CEPN Toward Zero Exposure Program Priority Chemicals

Specification on Substances Restricted for Use in Manufacturing

The substances listed in this table are not to be used in the manufacturing processes specified under "Restricted Applications."

Substance Name	CAS#	Restricted Applications	References[4]	Declaration Method
Ozone Depleting Substances	Refer to Table C, E	All manufacturing process	Dell Technologies' Materials Restricted for Use	SDoC[5]
Fluorinated Greenhouse Gases	Refer to Table Q	All manufacturing process	Dell Technologies' Materials Restricted for Use	SDoC[5]
Benzene	71-43-2	Cleaning & degreasing processes	IARC volumes; Classifications; EPA; CEPN[6]	By request from Dell MPC Program
Chloroform (Trichloromethane)	67-66-3	Cleaning & degreasing processes	IARC volumes; OSHA; CEPN[7]	By request from Dell MPC Program
n-Hexane	110-54-3	Cleaning & degreasing processes	OSHA; CEPN[7]	By request from Dell MPC Program
Methylene Chloride (Dichloromethane)	75-09-2	Cleaning & degreasing processes	IARC Classifications; OSHA; CEPN[7]	By request from Dell MPC Program
Pentachloroethane	76-09-2	Cleaning & degreasing processes	IARC volumes; CEPN[7]	By request from Dell MPC Program
1,1,1,2-Tetrachloroethane	630-20-6	Cleaning & degreasing processes	IARC volumes; CEPN[7]	By request from Dell MPC Program
1,1,2,2-Tetrachloroethane	79-34-5	Cleaning & degreasing processes	IARC volumes; CEPN[7]	By request from Dell MPC Program
Tetrachloroethylene	127-18-4	Cleaning & degreasing processes	IARC volumes; Classifications; EPA; CEPN[7]	By request from Dell MPC Program
Toluene	108-88-3	Cleaning & degreasing processes Specific Conditional Use Allowed[8]: Allowed for use in photoresist stripping.	IARC volumes; Classifications; CEPN[7]	By request from Dell MPC Program
N-Methyl Ppyrrolidone (NMP)[7]	872-50-4	Cleaning & degreasing processes	OSHA; CEPN[7]	By request from Dell MPC Program
1-Bromopropane	106-94-5	Cleaning & degreasing processes	CEPN[7]	By request from Dell MPC Program

[4] Provides background on the source of the substance restriction

[5] Refer to Materials Restricted for Use for guidance on how to declare conformance.

[6] Concentrations in mixtures must be below GHS cutoff reporting values (which is < 0.1% (1000 ppm) – the lowest cutoff value globally for these chemicals

[7] While NMP meets all the criteria for selection as a Priority Chemical, it lacks a viable, large-market scale alternative for photoresist stripping applications. Therefore, it is a Priority Chemical for any application besides photoresist stripping. It is recommended that research on alternatives be continued by the industry and that NMP be considered for a future phase-out.

Substance Name	CAS#	Restricted Applications	References[8]	Declaration Method
Methanol	67-56-1	Cleaning & degreasing processes	CEPN[7]	By request from Dell MPC Program
Trichloroethylene (TCE)	79-01-6	Cleaning & degreasing processes	CEPN[7]	By request from Dell MPC Program
Bis (chloromethyl) ether	542-88-1	Cleaning & degreasing processes	IARC volumes; OSHA	By request from Dell MPC Program
Cyclohexane	110-82-7	Cleaning & degreasing processes	OSHA	By request from Dell MPC Program
Pentachlorophenol	87-86-5	Cleaning & degreasing processes	IARC volumes; OSHA	By request from Dell MPC Program
Cumene	98-82-8	Cleaning & degreasing processes	CEPN[7]	
1,2-Dichloroethane	107-06-2	Cleaning & degreasing processes	CEPN[7]	
Diethylene glycol dimethyl ether	111-96-6	Cleaning & degreasing processes	CEPN[7]	
Dimethylformamide	68-12-2	Cleaning & degreasing processes	CEPN[7]	
2-Ethoxyethanol (ethylene glycol monoethyl ether)	110-80-5	Cleaning & degreasing processes	CEPN[7]	
2-Ethoxyethyl acetate (ethylene glycol monoethyl ether acetate)	111-15-9	Cleaning & degreasing processes	CEPN[7]	
Ethylbenzene	100-41-4	Cleaning & degreasing processes	CEPN[7]	
2-Methoxyethanol (ethylene glycol monomethyl ether)	109-86-4	Cleaning & degreasing processes	CEPN[7]	
Methyl isobutyl ketone	108-10-1	Cleaning & degreasing processes Specific Conditional Use Allowed[8]: Allowed for use in photoresist stripping.	CEPN[7]	
Nitromethane	75-52-5	Cleaning & degreasing processes	CEPN[7]	
Tetrahydrofurfuryl alcohol	97-99-4	Cleaning & degreasing processes	CEPN[7]	
Xylenes	1330-20-7	Cleaning & degreasing processes	CEPN[7]	

[8] Provides background on the source of the substance restriction

Demonstrating Conformance to the Guidelines and Specifications on Substances Used in Manufacturing

The Dell Manufacturing Process Chemicals Program monitors production facilities for conformance to these Guidelines. Suppliers shall demonstrate conformance to the Guidelines upon request by providing evidence that sufficient management systems are in place to manage and mitigate chemicals related risks to human health and the environment. Suppliers shall be able to demonstrate conformance to the Specification on Substances Used in Manufacturing upon request.

Substances that are specified by Dell Inc's Materials Restricted for Use shall continue to be declared via Dell's Supplier Declaration of Conformity in the Agile PG&C module. All others shall be disclosed to the Manufacturing Process Chemicals Program via the data collection format specified at the point of collection.

Waiver Process

Suppliers may seek a waiver of restrictions or exemption to the Specification on Substances Used in Manufacturing by writing to the Manufacturing Process Chemicals Program at scsustainability@dell.com. This may include suppliers that are concerned about achieving conformance at the expense of product quality or performance. Waivers may only be granted by the Manufacturing Process Chemicals Program. This may include suppliers that are concerned about achieving conformance at the expense of product quality or performance. Waivers may only be granted by the Manufacturing Process Chemicals Program.

Chemical Substitutions and Alternatives

When substituting a chemical with an alternative, the supplier must be able to demonstrate a traceable decision process that shows the alternative's potential to reduce risk to the environment or human health while conforming to Dell's criteria for product cost, quality, and performance.

If in order to demonstrate conformance to the Specification on Substances used in Manufacturing suppliers choose to make a chemical substitution, suppliers may request guidance from Dell Technologies on alternative substances and how to demonstrate conformance to Dell Technologies criteria for product cost, quality, and performance. Dell Technologies encourages suppliers to conduct thorough chemical reviews using industry tools such as GreenScreen® or IC2 Alternatives Assessment Guide and reference CEPN's Resources for Safer Alternatives and TCO Certified Accepted Substance List before implementing a chemical alternative.

Risk Mitigation Activities and Corrective Actions

In addition to monitoring conformance to the Guidelines and the Specification, Dell's MCP will engage suppliers through surveys, risk assessments, on-site visits, and capability-building activities targeted towards improving chemical management systems and their implementation in manufacturing operations. Suppliers will be requested to engage in activities as relevant to demonstrate their ability to meet Dell's expectations. Suppliers that face challenges in conformance will be asked to develop corrective action plans and to demonstrate continuous improvement.

Version History
Version 01: May 2017
Version 02: February 2025