

# CRITICAL CHEMISTRIES UNDER TSCA REVIEW



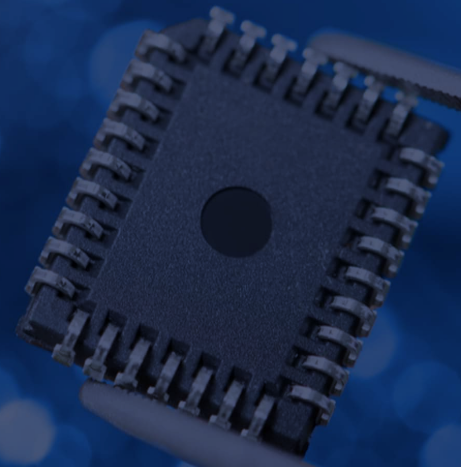
## Semiconductor Manufacturing

### Background

Semiconductor chips are vital components that enable the systems and products we rely upon daily, from telecommunications to computing to transportation to healthcare and more. A wide range of chemistries are necessary to fabricate the silicon wafer and prepare it for use in semiconductors.

While the Biden administration moves forward with its plan to increase American semiconductor production, federal agencies including the Environmental Protection Agency (EPA) are proposing new regulations and guidelines to restrict or even eliminate chemicals. The EPA's onslaught of new restrictions and increased regulatory uncertainty will jeopardize national priorities, the economy and American competitiveness.

Although the United States remains the world leader in semiconductor revenue, **its position has steadily declined over the past three decades**. The Biden administration and Congress should support policies and regulatory approaches to **enhance domestic semiconductor production and protect U.S. jobs, manufacturing and innovation**.



### TSCA and Semiconductor Manufacturing

A key aspect of the 2016 amendments to the Toxic Substances Control Act (TSCA) is the requirement for the EPA to base its **decisions on science and risk-based principles while taking care not to "impede or create unnecessary economic barriers to technological innovation."**

TSCA regulates several chemicals important to semiconductor production. Successful TSCA implementation requires the EPA to

use sound science and accurate exposure information to inform risk evaluations. If not, **chemicals essential for semiconductors could be restricted or eliminated from the supply chain** due to faulty processes and inaccurate data, impacting product availability and national security. The EPA's approach to TSCA implementation has a direct impact on the U.S. economy and the supply chain, including semiconductor production.

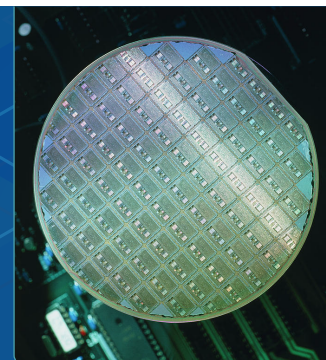
### Critical Chemistries in Semiconductors

**Chemistry is at the beginning of every supply chain.** In semiconductor manufacturing, chemistry can be found from start to finish. From the beginning of the process to the design, production, packaging and its final application, **you cannot manufacture a semiconductor without chemistry.**

Industry trade group SEMI estimates the fabrication of semiconductor wafers requires the use of **no less than 500 highly specialized chemicals**.<sup>1</sup> The chemicals necessary in semiconductor manufacturing **are already regulated under TSCA and are highly controlled in the modern workplace**. Additionally, these cutting-edge chemicals are designed to endure the intensive pressure and extreme temperatures of the rigorous and advanced manufacturing process. Introducing additional **regulatory restrictions and uncertainty will only disrupt the semiconductor supply chain and limit access to these essential chemicals.**

Some of the **critical chemicals undergoing TSCA risk evaluation include:**

- **1,1,2-Trichloroethane** is a chlorinated solvent used in the synthesis of 1,1-dichloroethylene (vinylidene chloride). Vinylidene chloride is used in semiconductor device fabrication for growing high-purity silicon dioxide (SiO<sub>2</sub>) films.
- **D4 (Octamethylcyclotetrasiloxane)** is a silicone monomer that is critical for the production of polysilicon wafers.
- **Formaldehyde** is used to create an identical, smooth surface during copper plating and its use for lithography is recognized as an irreplaceable industry standard.
- **NMP (N-Methyl pyrrolidone)** is a solvent used as a processing aid in the patterning process.
- **Trichloroethylene (TCE)** is a solvent used to enhance the semiconductor's performance.



### Using TSCA to Power the CHIPS Act

In August 2022, President Biden signed into law the CHIPS and Science Act of 2022 to strengthen America's semiconductor industry amid increased competition from China. The Semiconductor Industry Association (SIA) notes more than **\$210 billion in new private investments** have been announced across 19 states. These supply chain investments are estimated to produce more than **50 new semiconductor ecosystem projects and create over 44,000 new high-quality American jobs**.<sup>2</sup>

Sound and reasonable chemical management regulations are crucial to the ability to maintain robust and resilient supply chains in America. If the Biden administration's **goal is to make semiconductor chips in America, it should want to make the chemicals essential to producing the chips in the U.S. as well.**

The Biden administration needs to **redirect the EPA to focus on responsible policies** that protect human health and the environment without jeopardizing America's supply chain resiliency and competitiveness. When TSCA was amended in 2016, Congress understood that innovation and health and environmental protection were not mutually exclusive. The Administration should **use TSCA to foster American innovation, R&D, and manufacturing across the semiconductor supply.**

<sup>1</sup>SEMI, [Fluorinated Chemicals Are Essential to Semiconductor Manufacturing and Innovation](#), December 15, 2020

<sup>2</sup>Semiconductor Industry Association (SIA), [CHIPS and Science Act Delivering for America Fact Sheet](#), August 2023