



Cloud revolution: Transforming chemical labeling for the digital age

Achieve operational efficiency while meeting
global regulations






The chemical industry's balancing act

After working through a few challenging years, the [global chemical industry](#) entered 2024 with a positive outlook anticipating moderate growth. Rising demand, innovations, a push to digitalize, and a stronger industry focus on sustainability and decarbonization are all boosting the sector to help drive this growth.

The [chemical industry](#) also grapples with supply chain disruptions, geopolitical tensions, sustainability demands, and diverging standards. Emerging regulations are now prompting companies across various industries (not just chemicals) to reconsider processes and systems.

For example, key updates to the EU CLP (classification, labeling and packaging) — which aligns with the internationally recognized Globally Harmonized System of Classification and Labeling of Chemicals (GHS) — were published in January 2024 and begin to go into effect early 2025. And while this is an EU-based regulation, it will impact companies worldwide that won't be able to ship products into the EU if they don't meet the new requirements.

The updated EU CLP is far from the only new or evolving regulation companies in the chemical sector must worry about. As rules, regulations and guidelines evolve on an international basis, companies need modern Enterprise Labeling systems that support their business needs and help them stay compliant.



This paper explores the top challenges that organizations in the chemical sector are managing right now, shows how these roadblocks are impacting organizations and explains how modern, cloud-based Enterprise Labeling solutions are helping the industry conquer these challenges and reach higher levels of operational efficiency and comply with global regulations.

Chemicals: the building blocks of the modern world

From the gasoline that runs our vehicles to the synthetic fibers in our favorite athletic wear to the raw materials used to build our homes and buildings, chemicals touch virtually every corner of the modern world. Chemists continually develop new materials and processes; transform raw materials into a dizzying array of products; and help make our lives better while balancing the pursuit for global environmental sustainability.

Before they can share these innovations with the world, companies that work with chemicals must meet stringent regulatory requirements, grapple with fluctuating commodity prices, address geopolitical issues and overcome a myriad of other roadblocks. Whether it's a toller that manufactures and transports chemical components, a company that digs up phosphorus to be used for fertilizer or a global CPG that makes household cleaning products, these companies must meet a wide range of safety and regulatory labeling requirements.

Take feedstock, for example. The raw materials used to produce various chemicals, feedstock is processed and transformed via chemical reactions. It's then used to manufacture a wide range of products. As a vital component of chemical production, feedstock is purchased, refined, and then turned into a saleable product which then goes through multiple gyrations before transforming into a final product.

As chemicals make their way from feedstock to final product, companies keep a close watch on everything from raw commodity costs to transportation fees to logistics costs — all of which ultimately impact their bottom lines. This is an example of how complex the industry is and why digital transformation and cloud labeling adoption is imperative for organizations that must balance customer needs with regulatory requirements and profitability.




Supporting effective product stewardship

On the regulatory front, all chemical companies are responsible for product stewardship, or a holistic approach to ensuring safe, responsible management of chemicals across their end-to-end lifecycles. As part of this mission, organizations must educate customers through their labeling efforts on the safe handling, storage, use, and disposal of their products with clear, comprehensive labeling; safety data sheets (SDSs); and user training.

The GHS, for example, creates a universal language for chemical hazard communication. To meet this and other requirements, many companies maintain at least two different databases for their product labeling information: a regulatory database and then an enterprise resource planning (ERP) solution like [SAP](#) or Oracle.

These databases and business applications are used to draw data needed to produce shipping shelf labels and barcoding labels. The problem is that none of these business applications offer solutions that are purpose built for labeling. This means it is very difficult and time consuming to manage the labeling updates needed to keep pace with evolving regulations impacting the industry. However, a flexible cloud-based labeling solution which offers certified integration capabilities with sources of truth to provide reliability, consistency and accuracy along with the flexibility needed to manage labeling updates quickly and efficiently.

For example, one pharmaceutical chemical company relied heavily on orders obtained through their internet web page. Formulations could change frequently, but the manufacturer's labeling system didn't always reflect the changes in time for shipment. This created major headaches for the company's customers.



After struggling with the problem for years, the company put an Enterprise Labeling solution in place and was now able to change the data for its product, which automatically changed the label in real time. Using standard labels, templates and systems, the company now has a single source of truth for change management and global compliance.


What's new in the EU CLP update?

The [Council and the European Parliament](#) reached a provisional agreement on the regulation for the classification, labeling and packaging of chemicals. This regulation updates the existing 2008 EU legislation and aims to clarify the rules on labeling chemical substances and the required information for chemicals sold online. The provisional agreement adapts the EU CLP regulation to different forms of trade (such as online trade or trade-in refill products), promotes the circularity of the chemical products, makes labels clearer and easier to understand (including digital labeling), and ensures a high level of protection against chemical hazards.

The EU CLP regulation introduced four new hazard classes, with manufacturers, tollers, distributors, and many other companies cross industries that now having to comply with these regulations based on these timelines: Manufacturers, tollers, importers, downstream users and distributors placing their products on the EU market must [classify their substances or mixtures](#) by May 1, 2025 (for new substances on the EU market), November 1, 2026 (for those already on the EU market), May 1, 2026 (for next mixtures on the EU market) and May 1, 2028 (for mixtures already on the market).

Other key requirements included in the updated EU CLP regulation include:


- Easier access to updated information about chemical hazards and simplified labeling rules.
- Faster processes for all stakeholders to provide information on hazards of chemicals sold in the EU market.
- More efficient communication of chemical hazards (including online) through simpler and clearer labeling and advertising requirements (i.e., minimal font size for chemical product labels).

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- New Commission powers that speed up the procedure for identifying hazardous substances and making the necessary classification proposals.
 - Specific rules for refillable chemical products, with the goal of helping consumers safely buy and use chemical products sold in bulk (i.e., home care chemicals).

Other new regulations, taxes and requirements

Along with the CLP updates and long-standing GHS requirements, [government regulations](#), including everything from trade tariffs to “green” taxes, to outright product bans are making chemical production more expensive and riskier right now. Some of the newer regulations and taxes that are impacting chemical manufacturers, tollers, distributors and users right now include:

- The US Superfund Excise Tax now imposes a tax from \$.40 to almost \$24 a ton on the sale or use of 42 chemicals and 100 chemical substances. And, the EU Plastics Tax, which imposes a tax of EUR 0.80 per kilogram on non-recyclable plastic used in product packaging.
- The EU Carbon Border Adjustment Mechanism requires importers to buy carbon credits to offset the CO2 emissions of specific carbon intensive products such as steel, fertilizer, and cement.
- [CERCLA Rulemaking for PFOA and PFOS](#) is the EPA’s proposed designation of two PFAS chemicals as hazardous substances under Section 102(a) of CERCLA. The rule is expected to have wide-ranging impacts on chemical manufacturers and secondary users who dispose of waste containing PFOA and PFOS.
- In the U.S., California’s Assembly Bill 1200 (A.B. 1200) requires labeling of chemicals on a designated list (including PFAS) on cookware. The law also bars the practice of advertising that cookware is PFAS-free if the cookware contains any PFAS. Colorado’s Perfluoroalkyl and Polyfluoroalkyl Chemicals Consumer Protection Act bars the sale or distribution in Colorado of any product containing “intentionally added PFAS,” including carpets or rugs,



fabric treatments, food packaging, “juvenile products,” and certain oil and gas products. Finally, Maryland’s prohibitions on intentionally added PFAS in rugs or carpets, firefighting foam and food packaging went into effect in January.

Technology and digitalization trends in the chemical industry


Compared to other vertical manufacturing segments, the chemical industry has been slower to digitally transform manufacturing processes, but it appears to be catching up. In fact, the chemical industry spent [\\$4.4 billion](#) on digital transformation technologies in 2023. By 2031, ABI Research forecasts the industry will spend \$7.4 billion on the digitalization of its plants, led by the Asia-Pacific region (two-thirds of global spending).

Some of the top digital innovation trends impacting the chemical industry right now include advanced analytics, cloud computing, big data, artificial intelligence (AI), internet of things (IoT), digital twins, blockchain technology, and augmented reality, according to [Allied Market Research](#). The chemical industry uses advanced analytics and AI techniques to gain insights from large volumes of data, while AI algorithms assist in drug discovery and material design. The IoT devices are being deployed in chemical plants to monitor and control operations in real-time.

“Over the last few years, the chemical industry has experienced significant growth in terms of digital innovation,” Allied Market Research states. “These innovations come with high potential to revolutionize various aspects of the industry, including supply chain management, customer engagement, the manufacturing process, and R&D.”

Chemical manufacturers are also investing in cloud-based Enterprise Labeling solutions that provide end-to-end traceability, which is more critical than ever in today’s complex and interconnected business environment. Traceability not only helps chemical organizations meet regulatory requirements, but it also contributes to operational efficiency, risk mitigation, and the building of trust with both businesses and consumers. Enterprise Labeling solutions enable full traceability for all parties, providing a clear and auditable record of the entire production and supply chain process.

The stakes are especially high in regulated industries like chemicals, where quick identification and resolution of issues make an enormous difference. Cloud-based labeling solutions enable faster and more efficient ways to identify products for recall and the speediest way to pinpoint and retrieve



where they are in the supply chain. Implementing a cloud-based solution that helps to avoid recalls will minimize errors, ensure compliance, reduce financial implications, remove other knock-on financial implications, and help to ensure consumer safety.

Respond faster, manage regulations & keep customers happy

Companies operating in the chemical sector face a range of evolving requirements that many of them accept as a “cost of doing business.” But it doesn’t have to be. Labeling can make a huge difference, enabling IT and supply chain decision-makers to not just overcome challenges, but provide their company with a distinct competitive advantage.

A cloud-based labeling solution that meets good manufacturing practices retrieves data from multiple systems for the same label and enables users to adapt to these evolving regulations quickly and easily. In the case of GHS standards, for example, companies must publish six different elements on each label: signal word, product name, hazard statement, pictograms, manufacture information and precautionary statement to be compliant.

Companies must manage raw materials, feedstock, commodity pricing and regulatory issues — both locally and internationally — as well as deal with third parties while tracking products right to the customer. If businesses can’t meet all the global regulations established, then they are limited from shipping across borders and into new regions. Managing this isn’t easy, but by standardizing on a single, cloud Enterprise Labeling solution, organizations in the chemical sector or dealing with chemical labeling can reduce international shipping delays, minimize operational steps, lower inventory, and avoid mistakes.

As organizations expand into new markets and leverage new opportunities, they need systems that will meet their needs on a global and local level. These systems must incorporate proper, certified integration with systems of record like SAP and Oracle, and a cloud Enterprise Labeling solution that can handle different languages, regulatory standards, color printing, third-party and customer demands provides the flexibility needed.

With a cloud-based labeling solution in place, growing companies can leverage a chemical labeling strategy that helps them reduce inefficiencies and costs; respond faster to customer and regulatory requirements to ensure compliance; and improve the overall bottom line.



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