A Decade of Transformation

ZDHC Impact Report 2024

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Chapter 1
Introduction

A Future Built on Collaboration and Purpose

Frank Michel
Chief Executive Officer
ZDHC Foundation

Imagine a world where every product is made without harming our planet, where clean water flows freely, biodiversity thrives and communities prosper. This is the vision we're building together through the ZDHC Foundation.

As we celebrate our 10th anniversary, we reflect on our achievements and reimagine how meaningful progress can address the interconnected environmental challenges our world faces today. Ten years ago, ZDHC began with a bold and focused mission: eliminating hazardous chemicals from the textile, apparel, leather and footwear industries.

Launching our Manufacturing Restricted Substances List (MRSL) was more than a technical achievement. It was a rallying point - a shared commitment by brands, suppliers, and chemical companies to redefine how products are made.
Over the past decade, the ZDHC MRSL has grown into an industry-defining framework, widely adopted and rigorously implemented across thousands of manufacturing facilities. It continues to evolve with science and with the world around it.

Over the past decade, ZDHC has evolved into something more powerful: a trusted, collaborative platform anchored in science that drives global transformation.

Today, we stand at a turning point. Global supply chains face unprecedented pressure, regulatory demands are intensifying, and sustainability performance drives investment decisions. In this context, our mission has never been more relevant or urgent. Our path forward is clear: we're taking ZDHC's proven approach both deeper across our core industries and broader into new sectors. From the Supplier to Zero programme to our regional Implementation Hubs, we focus on enabling action and making sustainability easier. At the same time, we are broadening our perspective. The environmental risks of chemical use do not stop at the textile sector, nor will we. The next phase of our work is to position the ZDHC MRSL as a cross-sectoral manufacturing substance framework that can bring alignment to adjacent sectors such as electronics, packaging, automotive, home textiles and beyond.

These sectors are ready for transformation and ZDHC provides the proven, convening platform they need to accelerate progress. As a mission-led organisation with a decade-long track record of eliminating hazardous chemicals at scale, ZDHC offers tested frameworks, global implementation expertise and trusted governance. By facilitating alignment and creating shared value, we avoid duplication of effort and maximise impact, allowing the industry to invest once, but wisely.

This approach is not just strategic -- it's necessary. Environmental challenges are deeply interconnected - we cannot address climate change, water pollution and biodiversity in isolation. Solutions must work together, not compete against each other. We must recognise these ecological interdependencies to prevent unintended trade-offs undermining positive outcomes. ZDHC's Nature Strategy, introduced in this report, is our response to this challenge. It connects our chemical management expertise with broader ecosystem resilience and climate action, addressing environmental degradation at the source.

Our work contributes meaningfully to several Sustainable Development Goals (SDGs), in particular:

SDG 6 – Ensuring access to clean water and sanitation through upstream interventions
SDG 12 – Enabling responsible consumption and production via safer chemical processes
SDG 13 – Supporting climate action by preventing non-carbon pollutants
SDG 14 – Protecting marine ecosystems from chemical runoff
SDG 15 – Safeguarding biodiversity and ecosystems on land
SDG 17 – Creating effective partnerships to drive collective impact

Environmental, Social and Governance (ESG) analysts and investors increasingly recognise the value of this work. Chemical safety, pollution prevention and waste reduction are now material topics in the eyes of capital markets. ZDHC is uniquely positioned to provide the clarity, data and assurance that stakeholders request. Going forward, one of our strategic priorities is to educate ESG analysts on the depth and significance of sustainable chemical management and ensure our community receives due recognition for its progress.

Data drives everything we do. It is the foundation of transparency, accountability and continuous improvement, turning ambitious goals into proven results. Looking towards 2030, our mission stays the same and is crystal clear: ZDHC will continue serving as the global platform for practical, tangible and measurable change, creating a future where better chemistry protects life, land, air and water.

Thank you for walking this path with us. Let us now shape the next chapter -- together.

Our Shared Journey

Scott Echols
Chief Impact Officer
ZDHC Foundation

Ten years ago, the ZDHC Foundation was formally established with a bold vision: eliminate hazardous chemicals from the global fashion supply chains – not after the damage is done, but at the point of use. This approach, rooted in the tenets of Green Chemistry, was a dramatic change in thinking about how to eliminate the most hazardous chemicals in the fashion industry. Changing from a final product approach that ignored the potential impacts on workers and communities where products were made to banning those chemicals in the processes used for manufacturing using the ZDHC Manufacturing Restricted Substances List (MRSL).

This approach has since become a global benchmark. But, if the ZDHC MRSL was the force that carved out the path, the road ahead now demands we accelerate our pace and commitment.

We are entering a new era – one that demands radical transparency and impact-driven accountability. Full disclosure is no longer optional; it is the foundation of sustainable chemistry. Without visibility into the chemical substances used, product testing results and market trends for chemicals we are attempting to control, we cannot measure progress – nor can we claim it.

At ZDHC we are building the systems to make radical transparency possible, through the ZDHC Gateway Platform and our leadership programmes for brands, suppliers and chemical formulators. But tools alone are not enough. The truth is this: chemical pollution plays a silent but significant role in the degradation of ecosystems. And while ZDHC does not claim to restore nature, we do accept the moral responsibility to do no further harm.

That responsibility begins with eliminating hazardous inputs. It expands through our new Nature Strategy: a holistic commitment that includes water stewardship, biodiversity protection, circularity and decarbonisation. These pillars form the heart of our 2030 Impact Strategy. We pursue them not as separate goals, but as interdependent priorities that demand systems thinking, science and shared action.

Our ethical position is firm: there is no acceptable level of pollution in the making of clothes. Achieving zero discharge of hazardous chemistry is not just a technical target, it is a matter of environmental justice and intergenerational equity.

In a world flooded with green claims, real trust must be built on data, not declarations. A recent WWF and Globescan survey found that only 25% of the global public believes companies are honest about their environmental impact. This is a wake-up call. Transparency, accountability and independently verified progress must become the new baseline – not the exception.

Ten years in, we know this is not the end but a critical juncture. This report is a moment to pause, reflect and recommit. To celebrate the global community of changemakers who have joined us and to recognise how much work still lies ahead.

As we look forward, we invite you to stand with us. To insist on a system of sustainable chemical management that is radically transparent, scientifically grounded and morally resolute.

Because the future of fashion – and of the planet – depends on it.

Chapter 2
Executive Summary

We changed the conversation around chemical safety in fashion. Now we are changing the industry itself.

The ZDHC Foundation was established in 2015 on a revolutionary idea: rather than testing for hazardous chemicals after production, why not prevent them from entering production altogether? This upstream approach through our Manufacturing Restricted Substances List (MRSL) and Roadmap To Zero Programme has transformed how the global fashion industry can manage chemicals, protect workers and safeguard our shared environment.

Our Nature Strategy marks our next evolution – connecting the dots between chemical management, water stewardship, biodiversity protection and climate action. Chemistry sits at the heart of these interconnected challenges. Moreover, having transparent data about what's in our products is the very foundation for meaningful environmental progress and credible sustainability claims.

Current Challenges

While our progress is significant, data transparency remains insufficient, with only 12% of registered suppliers submitting full chemical inventories. We need deeper engagement across the supply chain and better visibility into chemical use to drive meaningful change.

Our goal by 2030 is ambitious but clear: 100% of chemical formulations in our community and 70% across the global industry should conform to the ZDHC MRSL. This is not just an environmental target, it's a business imperative that reduces risk, improves efficiency and builds consumer trust for everyone involved.

Chemical management is not a standalone issue. It is the very foundation for addressing water stewardship, climate action, biodiversity and worker health. Through our data-driven approach and collaborative partnerships, we're not just setting standards, we're catalysing the systemic transformation needed to protect life, land, air and water.

Activity-Based Impact: Building a Global Movement

Our Committed Community continues to flourish, having grown to more than 350 Signatories, including 57 brands, 59 chemical formulators and 45 suppliers actively implementing ZDHC guidelines. We've expanded to five global regions, including new operations in Türkiye and Brazil, delivering over 150 events to more than 17000 participants in 10 languages. Additionally, we're working on an optimised Sustainable Chemical Management Framework (SCMF), including the Supplier Roadmap to Zero, that will provide clearer guidance and more accessible implementation pathways.

Transformation Impact: Scaling Systemic Change

Between 2022 and 2024, registered suppliers increased from 8721 to 12972, a 49% growth that demonstrates how ZDHC's approach is becoming standard practice. Our partnerships with like-minded organisations have streamlined sustainability assessments, reducing audit fatigue and creating clearer pathways for improvement.

Nature Impact: Quantifiable Environmental Improvements

Today, more than 70% of suppliers consistently meet all ZDHC MRSL parameter wastewater requirements, demonstrating real reductions in hazardous discharges to nature. Scientific modelling with Quantis confirms that ZDHC MRSL-aligned practices, including the restriction of heavy metals like lead, cadmium and chromium, can reduce freshwater ecotoxicity by up to 86% compared to baseline scenarios. This impact extends beyond water: reductions in air emissions such as VOCs also improve water quality through decreased atmospheric deposition. Our partnership with The Microfibre Consortium has introduced standardised methods to measure and reduce fibre fragments in wastewater, which addresses an emerging risk to aquatic life. Meanwhile, the number of verified chemical products on the ZDHC Gateway grew by 32% from 2023 to 2024, increasing their availability across the industry and expanding access to safer alternatives that help reduce hazardous chemical use at the source.

Societal & Health Impact: Protecting People and Communities

Advanced ZDHC MRSL compliance reduces human toxicity by up to 95% compared to baseline requirements, directly benefiting workers, communities and consumers. Our participiation in Gender & Chemicals Partnership addresses gender-specific chemical exposure risks, recognising that women may be more vulnerable to certain chemicals. Moreover, through the ZDHC Academy and our network of 30 Approved Training Providers, we're building knowledge and capacity throughout the supply chain, with 238 trainings conducted in 2024 alone.

Chapter 3
Who We Are

ZDHC is a global multi-stakeholder initiative driving positive impact on water quality, chemical safety and environmental health across the fashion, textile and apparel industry. We unite brands, chemical suppliers and manufacturers to eliminate hazardous chemicals at their source, protecting both supply chains and the environment.

Through our Manufacturing Restricted Substances List (MRSL) and Roadmap to Zero Programme, we strive to prevent harmful substances from entering the supply chain, providing clear guidelines and solutions for lasting positive impact.

Our goal: We are working to achieve zero discharge of hazardous chemicals in the textile, leather and footwear value chain by 2030. To get there, we've created a holistic and interconnected approach, accelerating the adoption of practices that improve water stewardship, reduce chemical pollution and support circularity.

The ZDHC MRSL

Chemical safety in the fashion industry used to focus mainly on testing finished products – checking for hazardous substances only after items were made. But this approach comes too late in the process and too often fails to prevent pollution or protect workers.

ZDHC changed that by shifting the focus upstream, to where chemicals enter the manufacturing process. At the heart of this shift is our Manufacturing Restricted Substances List (MRSL), a list of hazardous substances that must not be intentionally used in chemical formulations during production. By banning these substances at the input stage, before they ever reach the factory floor, the ZDHC MRSL helps protect workers, communities and the environment from avoidable exposure and pollution.

The MRSL is more than just a list: it's the foundation of a system-wide approach to safer chemical use. Together with our Sustainable Chemical Management Framework (SCMF), ZDHC provides a practical, step-by-step method for suppliers, brands and chemical companies to:

- **Choose safer chemical inputs**
- **Improve how chemicals are stored, handled and used in production**
- **Monitor outputs such as wastewater and air emissions to ensure responsible discharge**

This full-circle approach – from input to process to output – means that chemical safety is no longer about reacting to problems after they appear, but about preventing them from the start.

ZDHC continues to refine this system. We are streamlining our Sustainable Chemical Management Framework (SCMF) and further developing our Supplier Roadmap to Zero, making it easier for facilities to take clear, meaningful steps toward safer chemical management.

> "ZDHC sets requirements that don't exist anywhere else in the world, like the ZDHC MRSL. Without ZDHC, we would not have these industry-aligned approaches or guidelines."

Mike Schaadt
Nike Chemistry Director and **ZDHC Board Member**

What's new in the improved SCMF?

Sustainable chemical management can be complex and our previous scattered guidelines made it harder to navigate. Based on user feedback, we are refining the experience without changing core requirements. The roadmap remains the same, just easier to follow.

We're simplifying the journey to make chemical management more accessible and impactful for brands, suppliers and chemical formulators. The enhanced SCMF and updated Supplier Roadmap to Zero (with frameworks for brands and formulators in progress) will replace fragmented guidance with clear, connected pathways.

This optimised, holistic framework offers a one-stop system that unifies input, process, and output management.

We're also going digital: moving away from PDFs to an interactive platform that helps users find relevant information faster and more intuitively.

Find out more about the MSRL at www.zdhc.org

Our Community

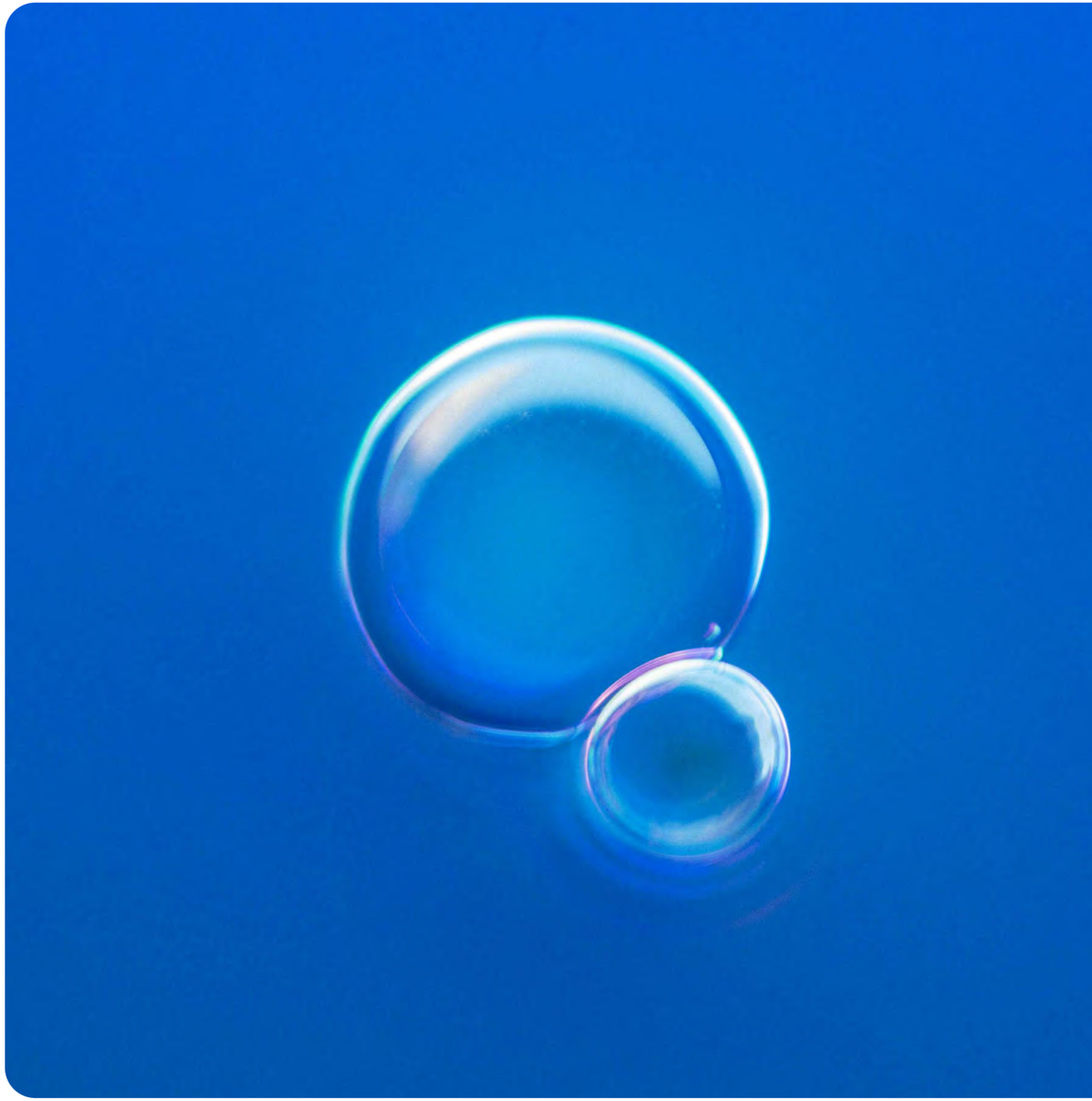
When a handful of brands first joined forces in 2011 to establish ZDHC, they ignited a movement that continues to empower the global fashion industry to take decisive action toward sustainable chemical management.

Our distinctive approach lies in our Roadmap to Zero Programme, which outlines a clear path for brands, manufacturers and chemical suppliers to follow in order to phase hazardous chemicals out of their supply chains.

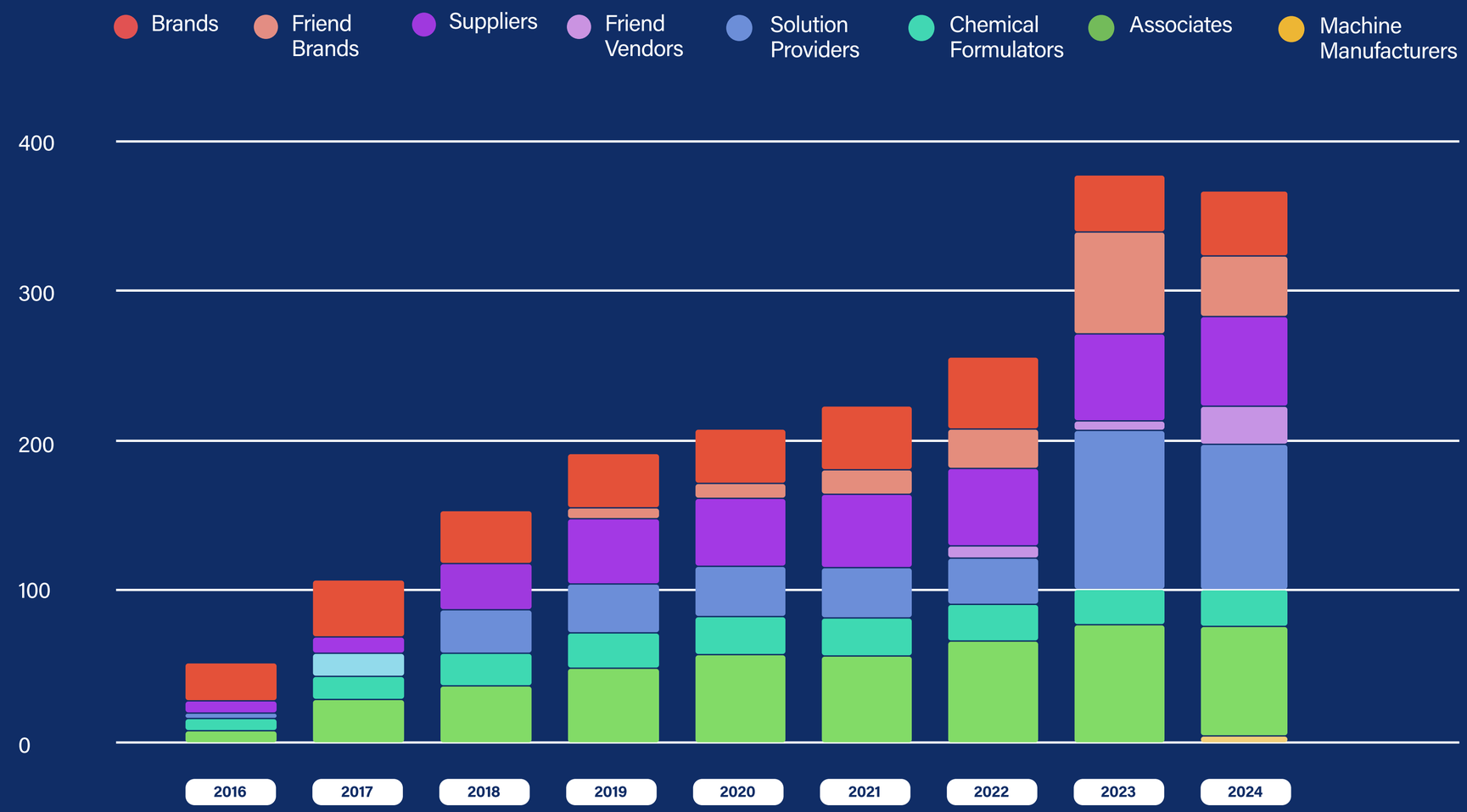
To do all of this, over the last 10+ years ZDHC has fostered deep partnerships among our community of brands, suppliers, chemical formulators and machinery manufacturers to build sustainable solutions that advance environmental, social, and economic well-being.

We continue to witness the remarkable growth and vibrant energy of our community. Today, our contributors include over 350 Signatory changemakers (brands, suppliers, formulators and solution providers) across five global hubs, all united by our ambition to eliminate harmful substances from global textile, apparel, leather and footwear value chains. The ZDHC community at large represents the very best of collaborative spirit, bringing together contributors who want to improve their chemical management through sustainable practices.

This year, we are proud to celebrate the ZDHC Foundation's 10th anniversary. What began as a purpose-driven vision to converge industry efforts with the breakthrough MRSL, to our **2030 Impact Strategy**, our work has been driven by actionable data, real-world impact and strong global collaborations. As we celebrate this milestone, we're not just looking back, we're gearing up to drive the next wave of sustainable innovation together.



Pioneering industry since 2015 (Signatory evolution)



Our History

2011

The Journey Begins

We formed the ZDHC Group with six initial brands to eliminate the use and discharge of hazardous chemicals in fashion in response to Greenpeace's "Detox My Fashion" campaign and its "Dirty Laundry" report.

2012

Foundations for Change

Our first full year focused on building infrastructure and partnerships to support systemic change. We completed benchmarking at 19 supplier sites, launched the first Chemical Inventory, initiated APEO phase-out work, and published research on alternatives to PFC-based water repellents. The first Annual Report was released.

2013

Building the Roadmap

We released the Joint Roadmap Version 2.0, refining our strategy into seven core workstreams. Key milestones included developing the first Environmental Audit Protocol, expanding stakeholder engagement, and finalising a sector-wide chemical hazard screening framework.

2014

Tools into Action

A landmark year with the launch of ZDHC MRSL V1.0, pilot testing of the Environmental Audit Protocol, expanded supplier training across Asia, and new collaborations with SAC, OIA, and LWG to drive global alignment on chemical management.

2015

Forging Ahead

The ZDHC Foundation was established as a non-profit in Amsterdam with 21 contributors and 4 staff. The first ZDHC Manufacturing Restricted Substances List (MRSL) V1.0 was released, setting a new standard for worker and environmental safety.

2016

Breaking New Ground

Regional expansion flourished with our new Shanghai office, while we grew to 50 contributors and 6 staff. A significant milestone was reached with the release of our first Wastewater GuidelinesV1.0.

2017

Accelerating Growth

Our first strategy and growth plan launched, expanding ZDHC's reach and deepening impact. Key achievements included releasing the ZDHC MRSL Conformance Guidance, soft-launching the ZDHC Gateway, approving initial wastewater labs and introducing ZDHC Academy training. We expanded to 75 contributors and 11 staff.

2018

Crossing Borders

We extended our presence to South Asia and Europe, growing to 122 contributors and 16 staff. Key initiatives included establishing the Brands to Zero Programme, launching the ZDHC Gateway's InCheck, began development on MMCF Guidelines and initiating the DMFa project. A notable achievement was reaching 100 contributors.

2019

Measuring Progress

Our first annual Impact Report revealed tangible progress as we grew to 157 contributors and 23 staff. The launch of the Roadmap to Zero Programme marked a pivotal shift, enabling our ongoing mission to eliminate hazardous chemicals across the global fashion value chain.

2020

Clearing The Way

We evolved from a finite 2020 goal to an infinite Roadmap to Zero programme. Significant achievements included releasing the Man-Made Cellulosic Fibres (MMCF) Guidelines V1.0 and launching our first online training sessions through the ZDHC Academy.

2021

Sharing Knowledge

We released the comprehensive the ZDHC Chemical Management System (CMS) Technical Industry Guide. Implementation projects launched in partnership with IDH in Vietnam and Ethiopia, extending our practical impact to new regions.

2022

Phasing Out Toxic Chemicals

We launched our impactful Detox Fashion Radar and released ZDHC MRSL V3.0. Not only that, but 96.9% of PFAS listed on the ZDHC Wastewater Guidelines V2.1 was eliminated.

2023

From Growth to Impact

We grew to 364 Signatories and over 50 staff and introduced the ZDHC 2030 Impact Strategy as our second strategy to address the discharge of harmful chemicals from the production of clothing and footwear.

2024

Connecting Continents

Our regional presence expanded to include Türkiye and Brazil, now spanning five key regions globally. We hosted over 150 events, engaging more than 17000 stakeholders across 10 languages, considerably broadening our international reach and impact.

Our People

Our Board

We are chemical management specialists, industry veterans and sustainability experts improving sustainable practices in the fashion industry while tackling environmental challenges takes teamwork. Few understand this challenge as well as our Board Members. They bring diverse voices to one table, all working toward the same goal: cleaner chemistry and a cleaner planet. In 2024, our Board hasn't just grown, it's become more driven than ever, pushing forward with renewed energy to make ZDHC's sustainable chemical management activities the industry standard.

> "ZDHC Foundation was born from a call to action. Zero is a mindset. In our first 10 years, we've become a respected global leader. The next five years could determine the next 25. Our Roadmap to Zero must remain relevant while providing trust and confidence for our industry. A renewed call to action will ensure we remain front and centre, providing affordable solutions while staying true to our Zero mindset."

Joe Little
ZDHC Board Chair

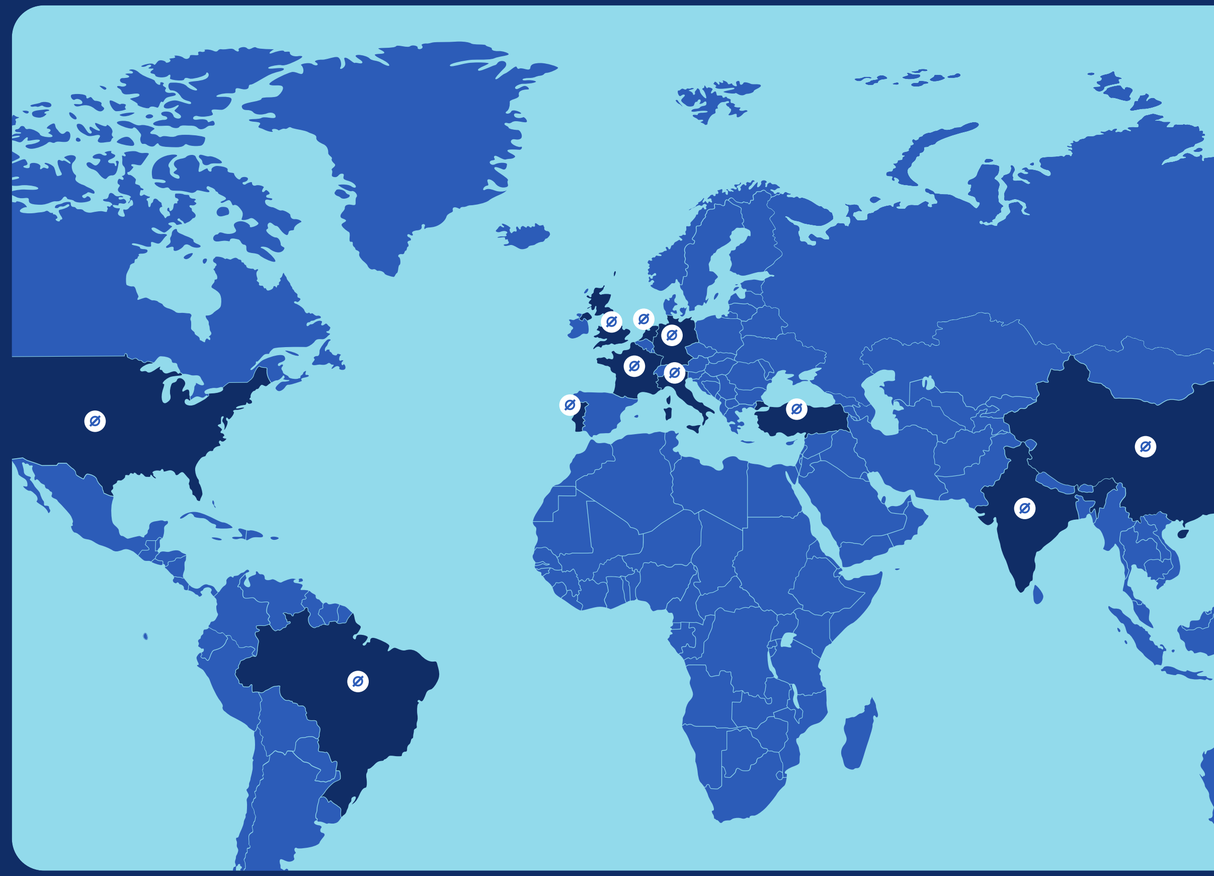
Our Team

A diverse global network of professionals fuels ZDHC's impact, showing the fashion industry that safer chemical practices are both possible and practical.

Our collaborative approach succeeds because of our **over 60** dynamic perspectives that span more than **15 countries** across Europe, Asia and the Americas, with women comprising 65% of our team. Since 2015, our international team has maintained a consistent foundation of expertise, allowing us to balance continuity with fresh perspectives.

Our team comprises chemical management specialists, industry veterans and sustainability experts who contribute diverse skill sets to our multifaceted approach. With regional implementation specialists based in key manufacturing hubs, we ensure our programmes respond to local needs while advancing global standards. But as our organisational mantra goes, **our job is far from done.**

With our 2025 strategic vision focusing on expanded presence across four continents, our talented team continues to strengthen partnerships with our **350+ Signatories Community**, while developing next-generation tools for sustainable chemical management.



Our staff is located in Brazil, China, France, Germany, India, Italy, Netherlands, Portugal, Türkiye, UK and the US.

Spotlight

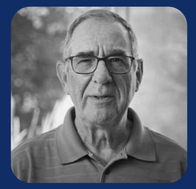
The Lifetime Award this year goes to Joseph Romano

Joseph Romano – Retired Technical Director Chemical Compliance Management for MAST – has been there with us since the very beginning. When six fashion brands first came together in 2011 with a shared vision for cleaner chemistry, Romano was among the pioneers who would help transform that ambitious dream into the ZDHC Foundation we celebrate today. He supported and led ZDHC's early work teams on the MRSL and chemical management system guidance.

Now, as ZDHC marks its 10th anniversary since its formal founding in 2015, Romano receives the Lifetime Achievement Award, recognition for his instrumental role in jumpstarting what has become a global movement for zero discharge and sustainable chemistry in fashion.

In his own words, Romano reflects on that remarkable journey: "From the early beginning, when we came together as six brands, there were no guidance documents, no ZDHC Foundation, only the passion and desire to push boundaries and create something new and truly remarkable in the world of fast fashion, clean chemistry."

> "It was shared at a senior level meeting that, 'Wouldn't it be great if at some point in the future we could have a video of our chief executive officers and factory personnel drinking a glass of water from the outfall of a discharge pipe?' That was zero discharge, and then it got real."



Joseph Romano
Retired Technical Director for MAST

Romano brought three decades of personal care industry experience to the unregulated fashion sector, describing it as "a total career change for me and a re-education about textile manufacturing and its chemistry. It rapidly became a personal challenge and involvement with so many intelligent minds."

The collaborative process wasn't easy: "Starting an MRSL and CMS, getting to those shared suppliers and that first MRSL was hard. Tedious collaborative work, but we got there and now it's MRSL V3.1."

Looking back on ZDHC's evolution, Romano observes: "ZDHC's current success was not born in a vacuum. It is the outcome of relentless questioning, collaborative problem solving, frustrations, revelations, patience, synergies and hard work."

His pride in the foundation's global impact is more than evident: "I'm heartened to see the ZDHC MRSL and cleaner chemistry adopted around the world for a better environment for my grandchildren."

Romano closes with the philosophy that built ZDHC: "One person can be impactful. A collaboration of individuals can change the world."

Who We Are

Our Mission

Our mission is to lead our global value chains to achieve the highest standards for sustainable chemical management, driving resource efficiency and circularity.

Our Vision

Our vision is to create a world where better chemistry leads to the protection of life, land, air and water.

Goal

We want 100% of chemical formulations used in the ZDHC Community and 70% of chemical formulations used in the global industry to conform to the ZDHC MRSL by 2030.

Our Tools

ZDHC sets the global benchmark for sustainable chemical management in fashion. Our guidelines are built on science, rooted in precaution and designed for implementation across global supply chains. At the heart of our system is the ZDHC Manufacturing Restricted Substances List (MRSL), which defines chemical substances that must not be intentionally used in production. Surrounding it is a suite of aligned guidelines, platforms and tools that ensure clear expectations and measurable progress.

Our work is aligned with key global frameworks such as the United Nations Sustainable Development Goals (SDGs), particularly those related to clean water (SDG 6), responsible consumption and production (SDG 12) and life below water (SDG 14). These requirements reflect our belief that sustainable chemical management is not just a technical challenge, but a critical pathway to protecting ecosystems, workers and communities.

Chapter 4
Numbers at a Glance

It Takes a Worldwide Movement to Create a Toxic-Free Fashion Industry

Throughout the past year, we've strengthened our commitment to sustainability through dynamic collaborations that span across continents and industries. Our 2024 achievements showcase not only our unwavering dedication but also the significant progress we've made toward building a more sustainable and resilient future.

17300+

Global Committed Community

It takes a Global Signatory Community

57	Signatory Brands
59	Chemical Formulators
45	Suppliers
19	Associates
1	Textile Machinery Manufacturer
17	Friend Brands
19	Friend Vendors
153	Approved Solution Providers

It Takes Education and Knowledge Sharing

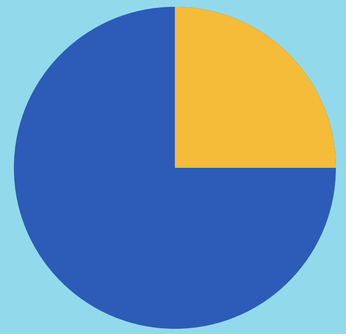
2700
ZDHC Academy Certificates issued

238
Approved Training Provider (ATP) trainings conducted in 2024

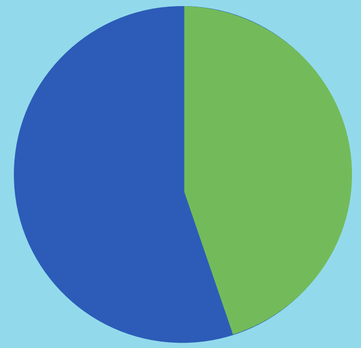
15
Academic Partnerships established

30
ATPs approved for training by the end of 2024

It Takes Industry-Wide Participation in Regional Activities



25% of ZDHC Signatory Brands participated



45% of Approved Solution Providers participated

It Takes Regional Engagement

10 Content available in 10 languages

17000+ Participants reached

150+ Events delivered in 2024

2 New expansion regions: Türkiye and Brazil

5 Global Hubs

Chapter 5
The Roadmap to 2030

The ZDHC Nature Approach

At ZDHC, we've developed a Nature Strategy that connects the dots between water stewardship, biodiversity protection, climate action and circularity. These challenges are interconnected and our solutions must be too.

No brand, supplier, or organisation can solve the fashion industry's environmental challenges alone. But together, we can create change. That's why ZDHC focuses on collective action: safer chemistry, smarter water use, circular business models and decarbonisation. When aligned, these strategies safeguard both people and the planet.

Chemistry sits at the heart of it all. If we don't have clear, transparent data on where products are made, how they're processed and which chemicals are used, we can't credibly claim progress. Transparency is not just about disclosure – it's about knowing enough to make better decisions, reduce risk and deliver on sustainability promises.

> "Get to know your supply chain, where your materials are coming from and what chemicals are being used on your products.
> That's the place to start for anyone."

Scott Echols
Chief Impact Officer
ZDHC Foundation

Why Chemistry Matters for Nature

Our Nature Strategy starts at the source – by eliminating harmful chemicals before they enter production. This approach enables the industry to:

- **Prevent ecosystem damage and support local environmental resilience**
- **Protect species and habitats by reducing toxic discharges**
- **Safeguard water quality and aquatic life**
- **Minimise harm in manufacturing communities**
- **Avoid circulating harmful substances through recycling systems**

Chemical management and climate action are inseparable. The substances we choose, and how transparently we manage them, set the stage for every other sustainability effort. That's why ZDHC is investing in holistic, systems-based solutions to transform how fashion is made.

Turning Action into Impact

Action and recognition should never be confused with making real progress towards a sustainable future. To lead meaningful change, the industry needs more than ambition, it needs evidence. That's why ZDHC has refined its impact framework to better demonstrate how our collective work translates into tangible environmental, social and business outcomes.

Aligned with our 2030 Impact Strategy, this framework organises data into four connected pillars to clearly separate action and recognition from systemic and environmental impacts:

This structure enables ZDHC and our partners to assess performance across programmes while maintaining a clear line of sight from action to outcome – backed by data, not declarations.

The Power of Interconnection

These four dimensions don't operate in isolation. They form an interconnected ecosystem, where progress in one area drives change in others. For example, eliminating hazardous chemicals reduces water pollution, protects biodiversity and improves worker health. Circular strategies reduce both waste and carbon emissions. Transparency is what ties it all together, because you can't manage what you can't measure.

By embedding traceability into platforms like the ZDHC Gateway and reporting tools like InCheck and ClearStream, ZDHC provides the industry with the visibility needed to make smarter choices, reduce risk and build consumer trust.

Why Chemistry Still Matters Most

The fashion industry's environmental footprint begins and can be dramatically reduced, at the chemical level. Our ZDHC MRSL continues to be a game-changer, enabling brands and suppliers to prevent pollution before it happens. This upstream focus underpins our holistic approach, allowing targeted actions to ripple across water, climate, circularity and community health.

Our Committed Community is now using this approach to drive progress on global sustainability goals – not through isolated efforts, but through coordinated, transparent and data-driven strategies.

Overview of Projects and Impact

● Influences ●● Enables ●●● Impacts directly

Guidelines	Energy Use	Water	Circularity	Air Emissions	Biodiversity
Air Emission Guidelines	●●●	●●	●	●●	
Fibre Fragmentation	●	●●●	●●		●●●
Man-Made Cellulosic Fibres and Dissolved Pulp Guidelines	●●●	●●●	●●●		●●●
Recycled Polyester Guidelines	●●●	●●	●●●		●●

Platforms	Energy Use	Water	Circularity	Air Emissions	Biodiversity
ZDHC Gateway	●●●	●●	●	●●	
ZDHC InCheck Report	●	●●●	●●		●●●
ZDHC ClearStream Report	●●●	●●●	●●●		●●●

Overview of Projects and Impact

● Influences ●● Enables ●●● Impacts directly

Implementation & Strategy	Energy Use	Water	Circularity	Air Emissions	Biodiversity
ZDHC Academy	●●●	●●	●	●●	
Suppliers to Zero	●	●●●	●●		●●●
Brands to Zero	●●●	●●●	●●●		●●●
Chemicals to Zero	●●●	●●	●●●		●●

Nature-aligned Area	Energy Use	Water	Circularity	Air Emissions	Biodiversity
MSRL Framework		●●●	●	●	●●●
Sustainable Chemicals Managment Framework		●●●	●●	●	●●●
Wasterwater Guidelines Programme		●●●	●	●	●●●

Activity-Based Impact

Stakeholder Engagement and Adoption

Our work isn't theoretical. It's practical and hands-on, delivered through the Roadmap to Zero Programme and designed to meet suppliers and manufacturers exactly where they are. From chemical formulators to factory floor operators, we support the day-to-day actions that move sustainability from aspiration to execution.

In 2024, ZDHC deepened its local engagement by expanding regional programmes across key production markets. This shift emphasises a simple truth: sustainable chemical management only succeeds when it's adopted on the ground. By embedding our tools, training and platforms closer to where production happens, we're accelerating uptake and ensuring that impact is both measurable and lasting.

Regional Expansion

In 2024, ZDHC deepened its presence in key manufacturing regions, including Brazil and Türkiye, expanding our reach across: East Asia, South Asia, Southern Europe and now Latin America. This strategic growth allowed us to deliver over 150 regionally tailored events – from InConnect sessions and Solutions Roadshows to webinars and conferences – reaching more than 17000 participants in 10 languages.

Brazil, with one of the world's most complete and complex textile supply chains, emerged as a top priority. The country's large domestic market, integrated production – from cotton cultivation to garment manufacturing – and rising export ambitions have made it a critical player in global textile production. Yet, Brazil's fragmented supply base and increasing environmental pressures, especially around water use and chemical discharge, underscore the urgent need for sustainable chemical management solutions.

In response, ZDHC engaged with local manufacturers, chemical suppliers, brands and trade associations to introduce the ZDHC MRSL Framework, build awareness of Supplier to Zero and discuss region-specific pathways for adopting our Roadmap to Zero Programme. These conversations revealed both high interest and shared challenges, particularly in providing access to compliant formulations and managing testing protocols.

A New Vision for Inclusive Sector Engagement at ZDHC with Francesco Pianca

Francesco Pianca
Chief Programme Officer
ZDHC Foundation

Francesco Pianca brings a unique perspective shaped by years on the brand side at Burberry and Benetton, as well as ZDHC's Board Chair until November 2024, when he joined ZDHC as Chief Programme Officer. Yet his focus is deliberately broader: to move beyond the brand-centric approach that has been a driving force at ZDHC since its founding.

This shift represents a strategic evolution in how ZDHC operates. Rather than continuing within traditional commercial hierarchies where suppliers respond to brand demands, Pianca sees an opportunity to unlock greater potential by enabling direct engagement across all sectors while remaining a brand-led organisation.

"I'm not here to push the brand perspective – it's already strong and well established," Pianca explains. "My focus is on bringing in the other voices that still need to be heard."

A Quiet Majority

Suppliers represent ZDHC's largest stakeholder group, yet they remain "the quietest" as Pianca puts it. "When we interact with Approved Solution Providers we don't have someone who speaks their language, who thinks like them, who they feel they can fully trust," he says. The solution lies in organisational refinement – placing sector-specific leaders that the sector can identify with.

The Confidence Crisis

Perhaps the most significant barrier Pianca identifies is a crisis of confidence around data sharing and impact measurement. Unlike climate impact, which is well-established and understood, nature impact remains nebulous and unmeasured. This uncertainty creates reluctance to share data, perpetuating a cycle where the very information needed to demonstrate progress remains hidden.

"If we were able to showcase the impact we're generating, we would all be injected with confidence and motivation," Pianca argues. He draws a powerful parallel to the Montreal Protocol's success with chlorofluorocarbons (CFCs), suggesting that ZDHC's impact could be equally transformative – if only it could be properly measured and fully appreciated.

Expanding the Roadmap

Central to Pianca's strategy is expanding the Roadmap to Zero beyond its current supplier focus. He envisions specific roadmaps for all sector groups – suppliers, brands and formulators – whether they're ZDHC Signatories or not. This democratisation of access aligns with the ZDHC's 2030 strategy goal of reaching 70% of the global industry.

"We need to invest more in enabling domestic markets to evolve and embrace roadmaps specific to their sector," Pianca explains, pointing to massive domestic markets in India and China as critical to achieving scale.

Redefining Success

For Pianca, success won't be measured in traditional metrics but in a fundamental shift in stakeholder attitudes. His vision: sectors actively seeking more engagement rather than viewing ZDHC requirements as burdens.

"The moment we have sector groups asking for more because they see how much they've benefited – when they can tell their investors and their customers how much they've contributed – that's when we'll know we're fully successful," he says.

This transformation from a voluntary compliance burden to a reflection of ethical leadership represents the ultimate goal of Pianca's inclusive approach. When ZDHC engagement becomes "a joy", a rewarding experience, the organisation will have achieved the sector-wide buy-in necessary to meet its ambitious 2030 targets.

ZDHC's Leader Programmes

At ZDHC, we've built our approach on a clear foundation: eliminate hazardous chemicals at the source. The **ZDHC MRSL** is the tool that makes this possible, setting a global baseline for safer inputs across the fashion, footwear and leather industries.

But a guideline is only meaningful if it's applied consistently and visibly. That's where our **Leader Programmes** come in. They support brands, suppliers and chemical formulators in translating ZDHC's expectations into day-to-day practice, helping them adopt the ZDHC MRSL, improve performance and demonstrate real progress.

Each programme offers a structured path forward. Participants can see where they stand, identify what to improve and advance through defined levels based on action, not intention. Just as importantly, they are asked to show their work. By encouraging openness and comparability, the Leader Programmes help move the industry toward greater **transparency** and **accountability.**

In the sections that follow, we highlight three key programmes:

Brands to Zero, which supports brands in embedding chemical management across governance and sourcing practices

Supplier to Zero, which helps facilities improve chemical and wastewater practices on-site

Formulators to Zero, will enable chemical formulators to be assessed for their product stewardship systems, corporate sustainability practices and targets, sustainable sourcing of raw materials and products certified to the ZDHC Chemicals to Zero Framework. This programme is under development, and more information will be provided as it becomes available.

Together, these initiatives form a practical framework for putting the ZDHC MRSL into action building not only safer supply chains, but a system that makes progress visible and verifiable.

Brands to Zero

Brands play a pivotal role in transforming how our industry implements sustainable chemical management. The heart of this effort is the ZDHC MRSL and further guidelines, which form the Brand Roadmap to Zero. But the guidelines alone are not enough. The real impact comes when brands actively implement the principles of Sustainable Chemical Management across their supply chains and follow the joint Brand Roadmap to Zero. Each brand amplifies the words and actions of the others to create impact. The Brands to Zero (BtZ) annual assessment provides clear milestones for this joint roadmap and holds Signatory Brands accountable for joint implementation. It helps brands turn sustainability commitments into real-world due diligence results – tracking progress, identifying gaps and building trust through transparency. We call this **action that creates impact.**

The Brands to Zero assessment focuses on the brands effort and impact on two levels:

- **Corporate Level:** Brand's performance with regard to relevant commitments made, setting them into practices and supply chain engagement. Based on the OECD Guidance, goals and strategies set, implementation plans, enabled staff and responsible business practice or decision-making are evaluated here, as well as standard operating procedures.
- **Supply Chain Level:** Brands' general approach to each of the ZDHC's guidelines, platforms and solutions, brands' adoption practices and how they monitor the implementation scale of ZDHC in their supply chain. Furthermore, this segment evaluates the follow-up and corrective action practices that brands have in place if the suppliers do not meet the expectations and the level of supply chain engagement achieved.

Therefore, three essential elements are embedded in Brands to Zero:

- **Leadership and Strategy:** How brands integrate sustainable chemical management into their corporate framework and business strategy.
- **Supplier Engagement:** How brands implement due diligence and work with supplier factories to improve practices - clear communication and aligned requirements, offering guidance, training and follow-up and remediation where improvements are needed.
- **Chemical Use and Tracking:** How brands ensure their suppliers are using ZDHC MRSL-conformant chemicals ultimately driving the community to reach ZDHC's strategic goal of 100% MRSL conformance in 2030.

Brands to Zero Assessment Champion Level 2025

adidas, BURBERRY, F&F, LEVI STRAUSS & CO., PUMA, KERING, VS&Co VICTORIA'S SECRET & CO., NEXT, H&M Group, asos, MARKS & SPENCER LONDON, INDITEX, G-STAR RAW, new balance, DECATHLON

The 2025 Champion Brands list is based on the year 2024 as a reference period.

Supplier to Zero: Raising the Bar Across the Supply Chain

Suppliers are the foundation of a more sustainable fashion industry. Through the **Supplier to Zero (StZ)** Programme, ZDHC helps manufacturing facilities start with the basics and advance towards leadership through a continuous improvement process.

Supplier to Zero provides a clear step-by-step pathway through three levels of performance:

- **Foundational (Level 1):** Getting the basics right - understanding ZDHC's requirements and beginning structured improvements.
- **Progressive (Level 2):** Demonstrating verified implementation of safer chemical management and wastewater practices.
- **Aspirational (Level 3):** Leading the way with proactive systems, innovation and full alignment with ZDHC's Vision.

The programme focuses on practical outcomes - improving chemical inventories, preventing hazardous discharges and supporting **ZDHC MRSL conformance** across factory operations.

A Growing Movement

Launched in July 2020, the Supplier to Zero Programme continues to gain momentum. In 2024:

- **1684** facilities achieved **Level 1**, showing wide engagement at the entry point.
- **Level 2** certifications grew by **85%**, from **126** in 2023 to **234** in 2024 - evidence that more suppliers are moving beyond awareness into implementation.

This trend reflects a growing commitment across the supply chain - but it also highlights a key challenge: **many facilities need continued support, training and visibility to keep progressing.**

Making Progress Visible

Supplier to Zero is more than a checklist. It gives suppliers a framework to:

- **Understand what good chemical management looks like**
- **Take action at their own pace**
- **Show measurable progress - building trust with brands, regulators and their communities**

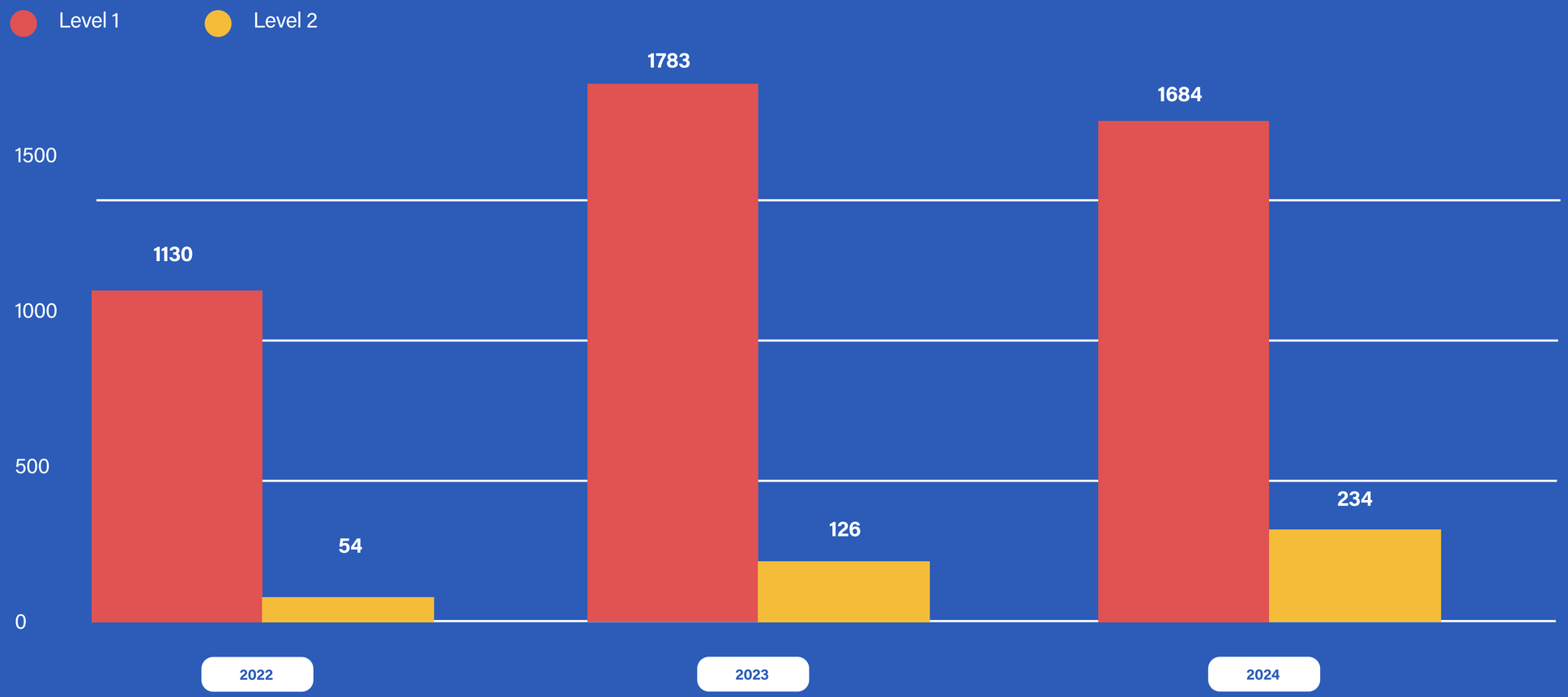
As with Brands to Zero, this programme emphasises transparency, data and shared responsibility. It's not about perfection, it's about progress.

By building capacity at the factory level, Supplier to Zero helps ensure that sustainable chemical management is not just a brand policy but a daily practice across the industry.

What Makes a Supplier to Zero Leader?

A **Supplier to Zero Leader** is a **supply chain game-changer**, driving the shift from reactive compliance to proactive prevention practices. They are thought leaders and culture-change agents. They set the pace for the on-the-ground implementation of sustainable chemistry, embedding bold, forward-thinking values into daily operations, transforming chemical management into a source of industry influence.

Number of Certificates issued Suppliers to Zero



Spotlight

ZDHC at FEBRATEX 2024

As part of our regional outreach in Brazil, ZDHC participated in FEBRATEX 2024, one of Latin America's largest textile technology trade fairs. The event showcased new dyeing technologies, water-saving finishing methods and the increasing demand for chemical compliance. In his remarks, ZDHC CEO Frank Michel captured the essence of the challenge:

> "Don't forget chemistry. It is the backbone of all sustainability activities. You cannot talk about water stewardship or climate change programmes if you don't control the baseline, which is chemicals."

Frank Michel
Chief Executive Officer
ZDHC Foundation

ZDHC's presence helped raise awareness, build new partnerships and highlight our role as a trusted framework for advancing sustainability in Brazil's textile sector.

Brazil's inclusion in ZDHC's regional networks marks a significant step toward broader adoption of the ZDHC MRSL, stronger local ownership of our guidelines and more regionally driven progress in sustainable chemical management.

Transformation Impact

System Change and Industry Adoption

Creating systemic change requires more than individual actions, it requires shared frameworks, coordinated tools, and a critical mass of stakeholders working in alignment.

The growth of the ZDHC Committed Community reflects this transformation: from isolated efforts to a unified movement toward safer chemistry. The ZDHC MRSL once seen as a bold shift from end-of-pipe control to input management, is now the foundation of an industry-wide infrastructure that supports measurable, lasting change. Community growth is not just a number – it signals increasing accountability, investment in common tools and readiness for scale. The graph on the next page illustrates how ZDHC's expanding ecosystem of brands, suppliers and formulators is laying the groundwork for permanent transformation across global value chains.

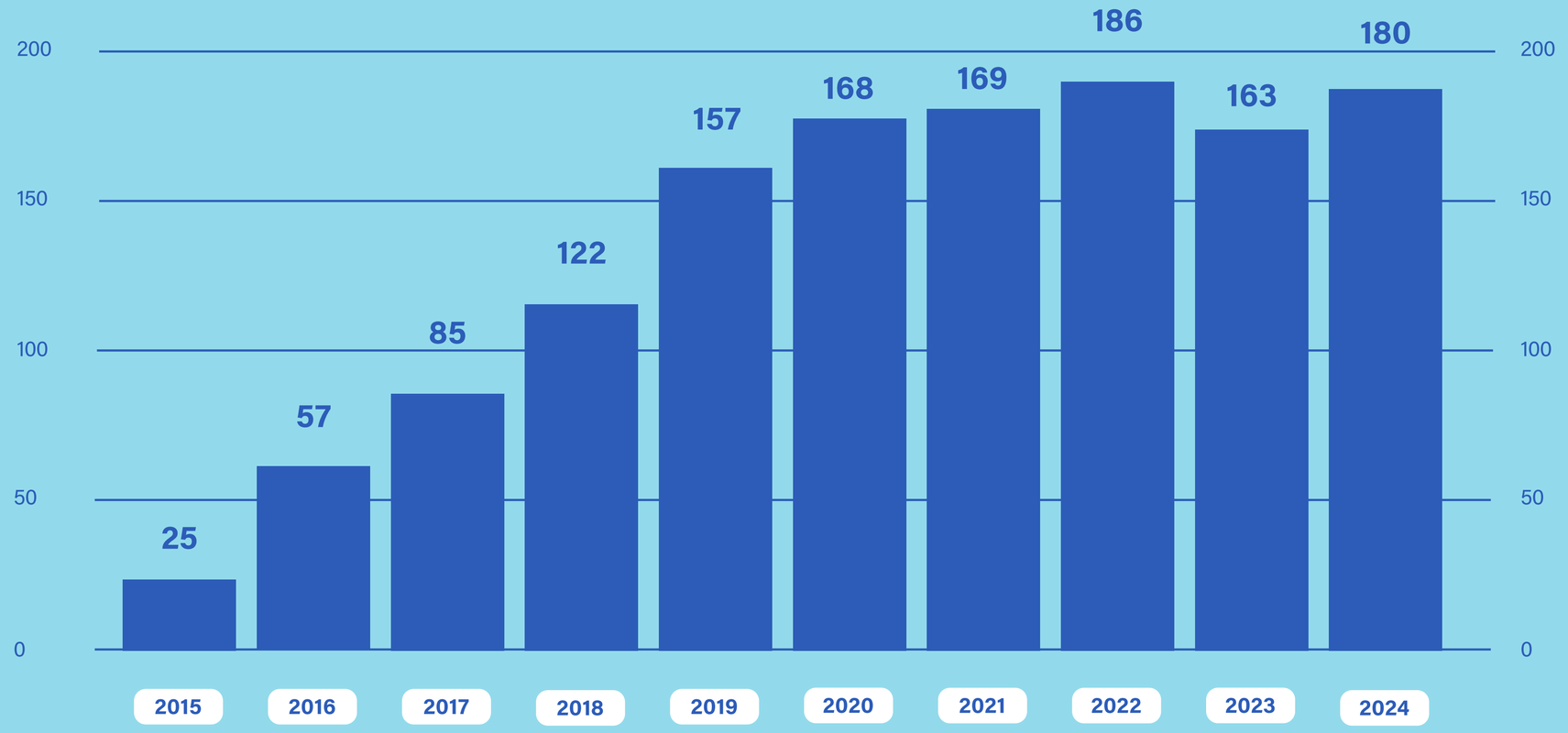
The long-term expansion of ZDHC Signatories demonstrates how an early shift in paradigm has grown into a durable industry movement. What began as a pioneering initiative is now a global benchmark, helping embed safer chemistry into supply chain governance and buyer expectations.

Over nearly a decade, supplier engagement has accelerated, showing how industry norms have shifted from optional compliance to a shared operational baseline. This widespread adoption indicates that ZDHC's guidance is increasingly embedded into brand value chains globally.

The adoption of ZDHC guidelines by chemical formulators has grown steadily, reinforcing the reach of the MRSL paradigm shift in driving safer chemical inputs.

Growth in ZDHC Signatories

The long-term expansion of ZDHC Signatories demonstrates how an early shift in paradigm has grown into a durable industry movement. What began as a pioneering initiative is now a global benchmark, helping embed safer chemistry into supply chain governance and buyer expectations.



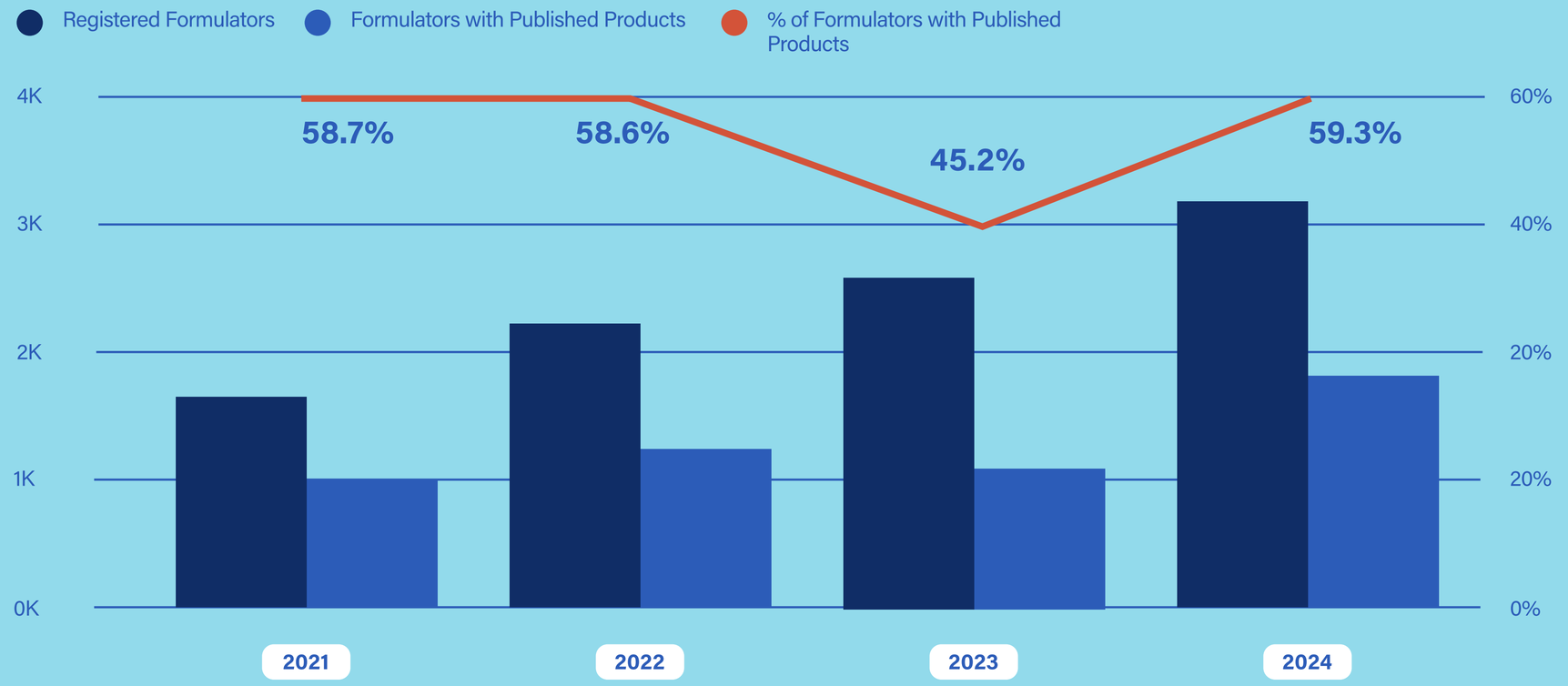
Registered Formulators and Published Products

From 1705 in 2021 to 3122 in 2024, the +83% growth in registered formulators demonstrates strong and expanding alignment with ZDHC's Vision. This growth signals more than participation -- it reflects systemic adoption of safer chemical principles across the formulation landscape. The journey, however, has not been without challenges.

In 2023, the number of formulators with published products declined from 1,285 to 1,193, likely in response to the stricter compliance thresholds introduced with ZDHC MRSL V3.1. Yet, this dip marked a moment of recalibration rather than retreat.

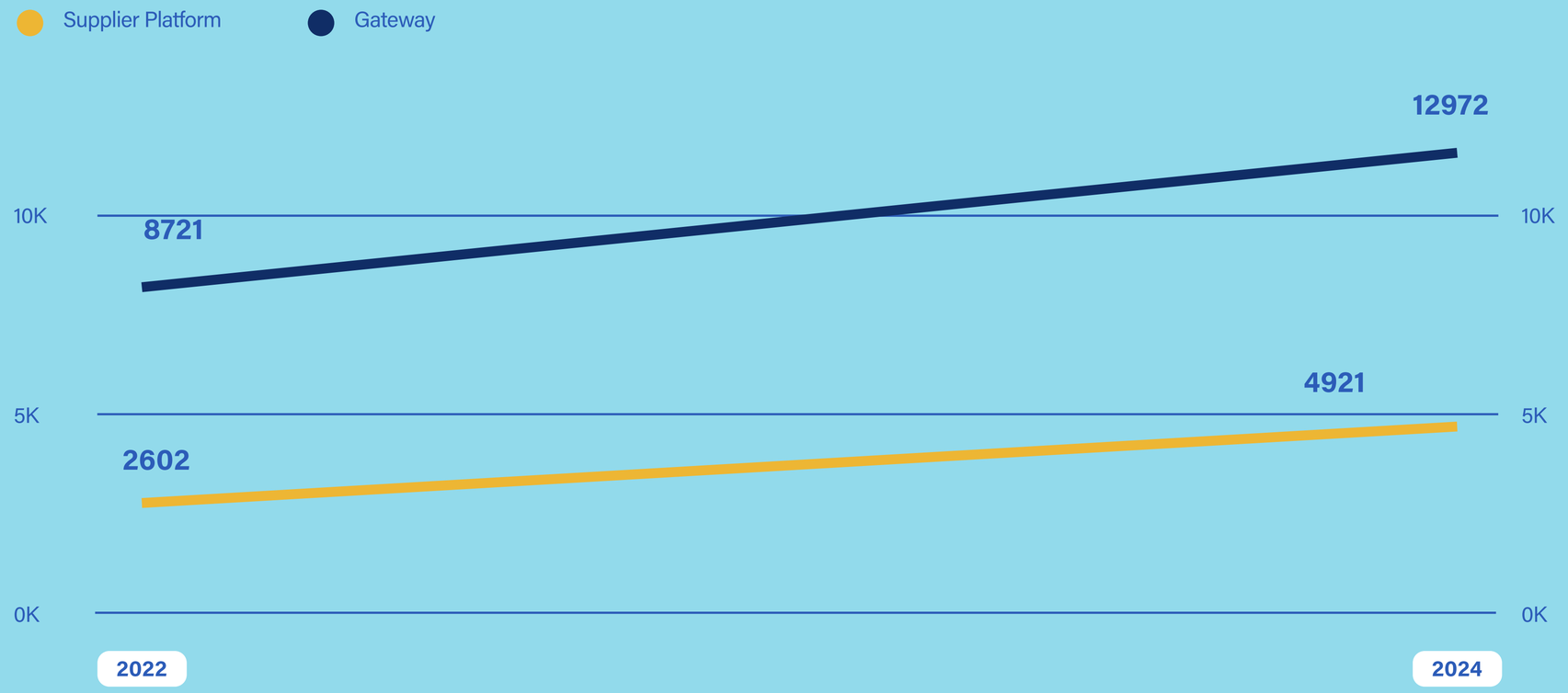
By 2024, the percentage of published formulators rebounded to 59%, suggesting that increased technical support and strengthened compliance processes are enabling the community to adapt and scale.

This responsiveness underscores a key tenet of systemic change: resilience through aligned expectations, shared standards and collective progress.



Supplier Registration and Platform Engagement

Over nearly a decade, supplier engagement has accelerated, showing how industry norms have shifted from optional compliance to a shared operational baseline. This widespread adoption indicates that ZDHC's guidance is increasingly embedded into brands' value chains globally.



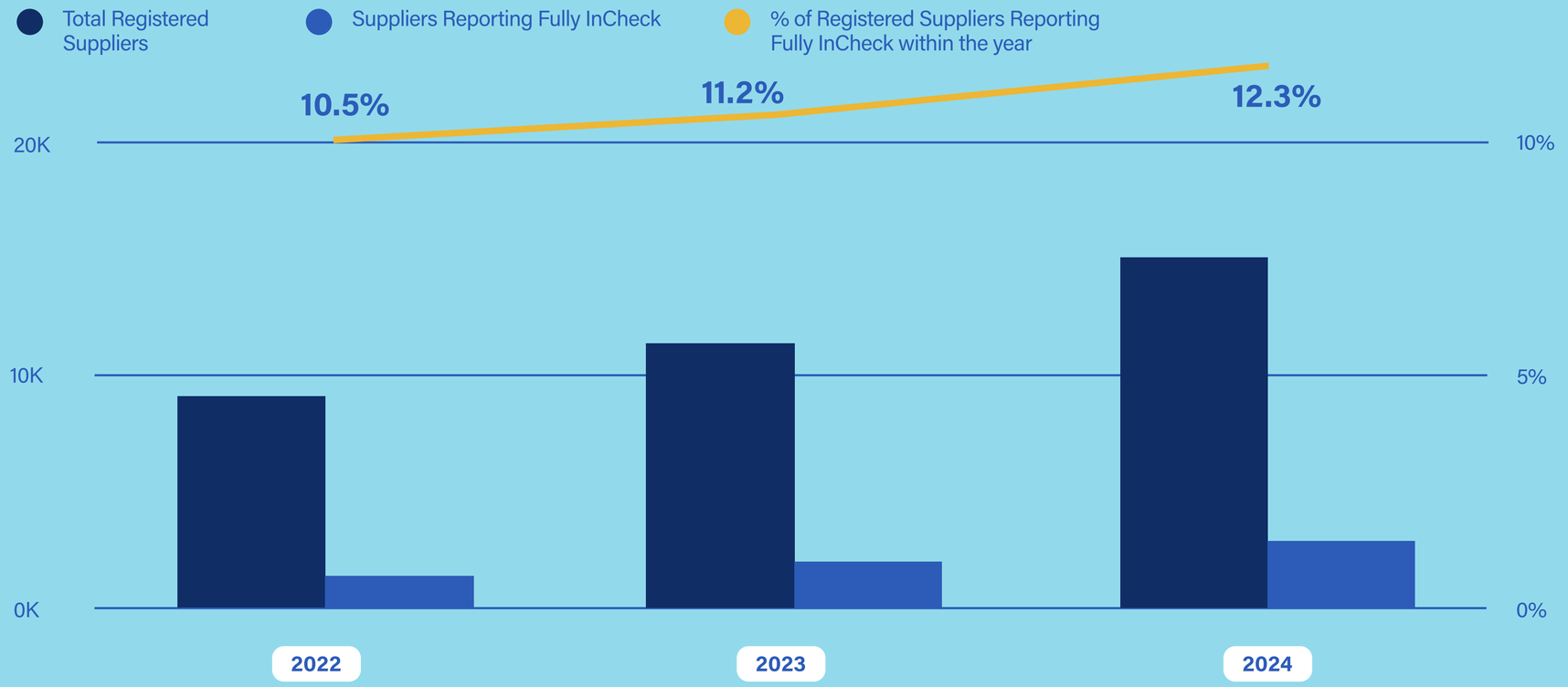
Growth in Registration, Need for Deeper Engagement

The ZDHC MRSL has driven significant growth in supplier registration, as more manufacturers recognise the importance of input-based chemical management.

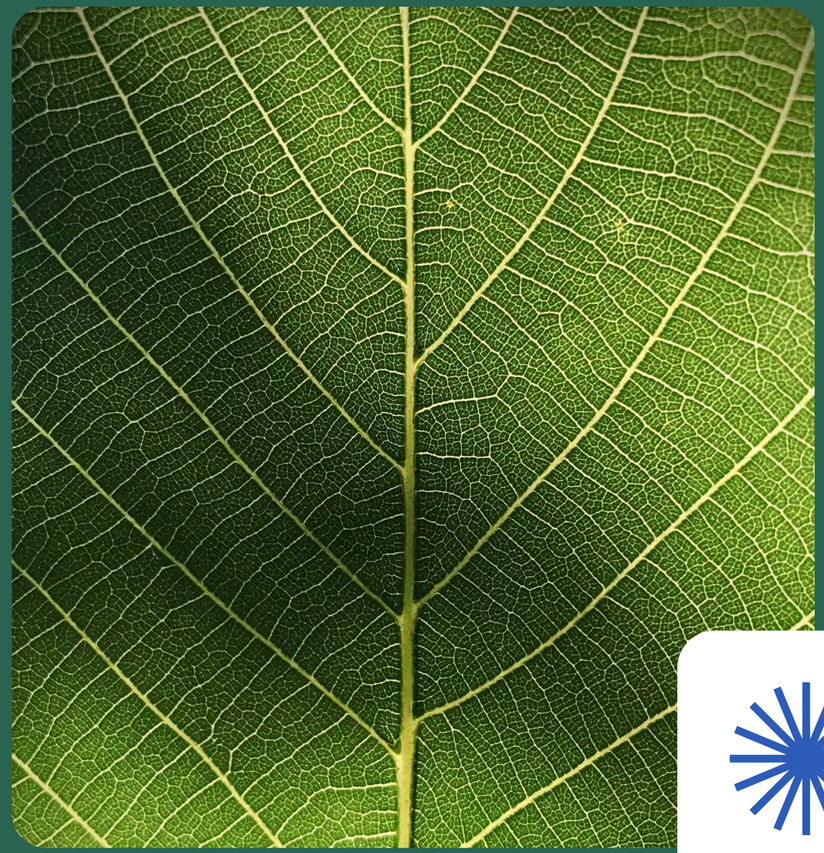
Between 2022 and 2024, registered suppliers increased from 8721 to 12972 (+49%), showing sustained interest in ZDHC programmes. However, while the number of suppliers reporting a full InCheck rose from 918 to 1599, the reporting percentage increased only modestly - from 11% to 12%.

This gap highlights a key challenge: growing interest is not yet translating into full participation. Despite ZDHC MRSL-driven awareness, barriers remain in achieving full compliance reporting.

To bridge this gap, targeted efforts are needed. Simplified compliance pathways, improved training and stronger brand partnerships can help accelerate supplier engagement. Continued tracking of participation and addressing the underlying obstacles will be essential to align supplier action with ZDHC's 2030 goals and ensure the ZDHC MRSL's full impact is realised across the supply chain.



Nature Impact



Environmental Outcomes, Water Stewardship and Data Transparency

When it comes to environmental harm in fashion manufacturing, one stage stands out: **wet processing.** This is where fabric is dyed, printed, bleached and finished to achieve the look, feel and performance we expect from clothes. It happens after yarn and fabric are made, but before garments are sewn. And it's here, at what's often called Tier 2, that the most water, energy and chemicals are used.

That's why ZDHC focuses its work here. By setting clear rules for which chemicals should not be used, through our Manufacturing Restricted Substances List (MRSL), we aim to stop pollution before it starts. The idea is simple: better inputs lead to safer outputs. If we avoid harmful substances from the beginning, we protect rivers, ecosystems and the people who depend on clean water.

We know we don't have perfect data for every substance or every outcome. But the science is strong enough to act. Toxicology tells us that many chemicals used in wet processing are hazardous to health and nature. So we take a precautionary approach: reduce known hazards now while continuing to improve how we measure and trace impact.

This is already making a difference. Brands and suppliers using the ZDHC MRSL are reducing chemical hazards in real-world settings. And as we build better tools to measure results, we stay grounded in one core belief: **the cleaner the chemical input, the better the environmental outcome.**

What Happens in Wet Processing?

The dyeing and finishing stage includes:

Pre-treatment: Preparing fabric to absorb dyes evenly

Bleaching: Removing natural colour to prepare for dyeing or printing

Dyeing: Adding colour to fabrics with natural or synthetic dyes

Printing: Creating patterns and graphics

Finishing treatments: Applying chemicals to give fabric softness, stretch, water repellency, or wrinkle resistance

These processes may be invisible to most consumers, but they represent a major share of the fashion industry's environmental footprint, and the greatest opportunity to create cleaner fashion from the inside out.

From Hazard Control to Impact Transparency

As the industry looks ahead, ZDHC is not only redefining what responsible chemical management means, but also how its results are verified. Our MRSL sparked a critical shift: from reactive cleanup to proactive prevention. Now we're building on that foundation, moving toward a system grounded in transparency, where decisions are backed by credible, measurable data.

The next step is visibility. We're equipping our community with the tools to connect better chemical choices to real-world outcomes – improvements in water quality, healthier ecosystems and reduced biodiversity loss. It's about making impact visible, not just assumed.

Even without complete data, our reasoning has always been clear: these chemicals were phased out because doing so protects water, ecosystems and future generations.

By advancing both the science and the measurement of impact, ZDHC is building a new model for responsible production, one where smart choices upstream deliver real environmental results downstream and transparency becomes a competitive strength.

Evidence of Progress: Supplier Performance on ZDHC MRSL Conformance

At ZDHC, we've built our approach around a simple principle: **prevent harm before it happens.** That's why we measure progress not just by outcomes, but by what chemicals enter the supply chain in the first place.

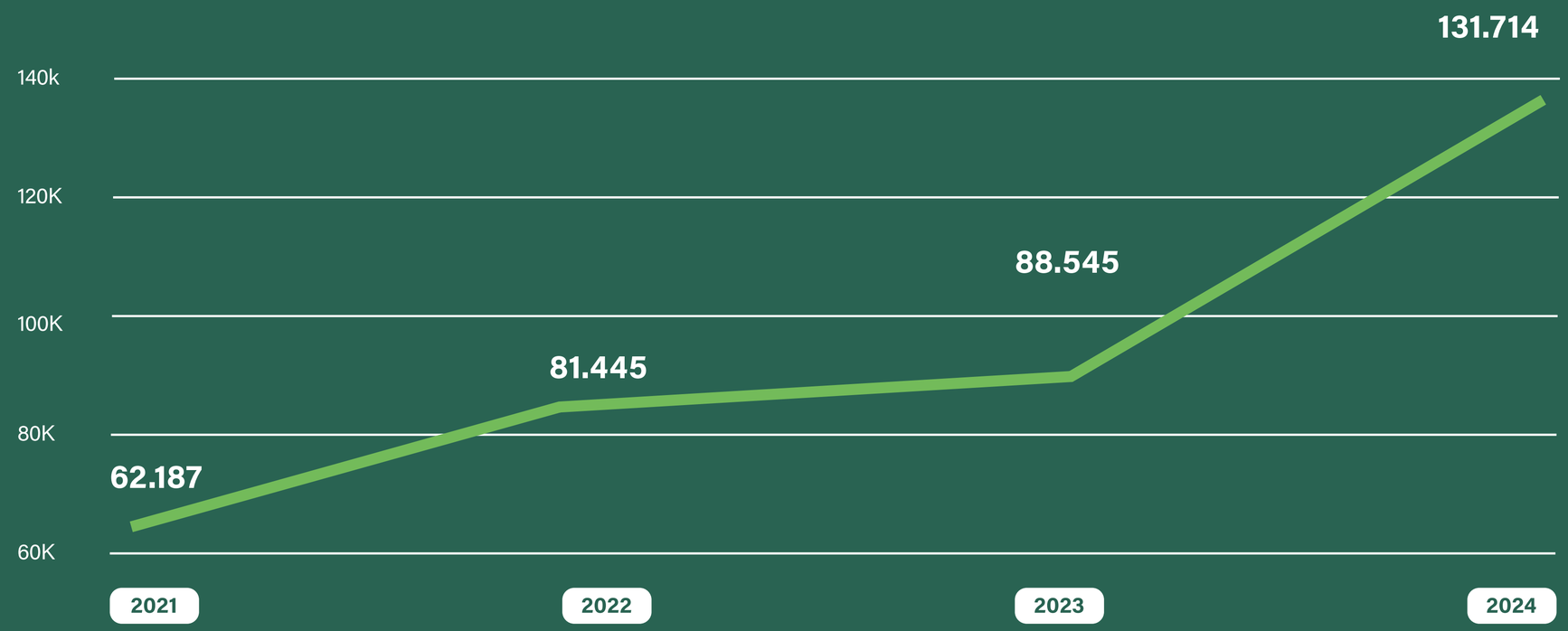
The ZDHC Gateway – our chemical formulation platform – makes it easier for suppliers to choose safer alternatives that meet ZDHC MRSL requirements. It replaces guesswork with clear, verified information, helping suppliers make confident, responsible decisions. This shift changes the dynamic: instead of waiting for brands to dictate chemical choices, suppliers can lead, actively choosing safer inputs that meet ZDHC requirements.

That's the foundation of our **2030 Goal: to see 100% of chemical formulations used within the ZDHC Community and 70% across the broader global industry, conform to the ZDHC MRSL.**

And it's working. The ZDHC Gateway data shows clear and consistent improvements in supplier performance, proof that when the right tools are available, the industry moves faster and further together. This progress is reflected in the steady growth of verified chemical products listed on the ZDHC Gateway.

Evolution of Published Products

Tracking the Industry's Shift Toward MRSL Conformant Formulations

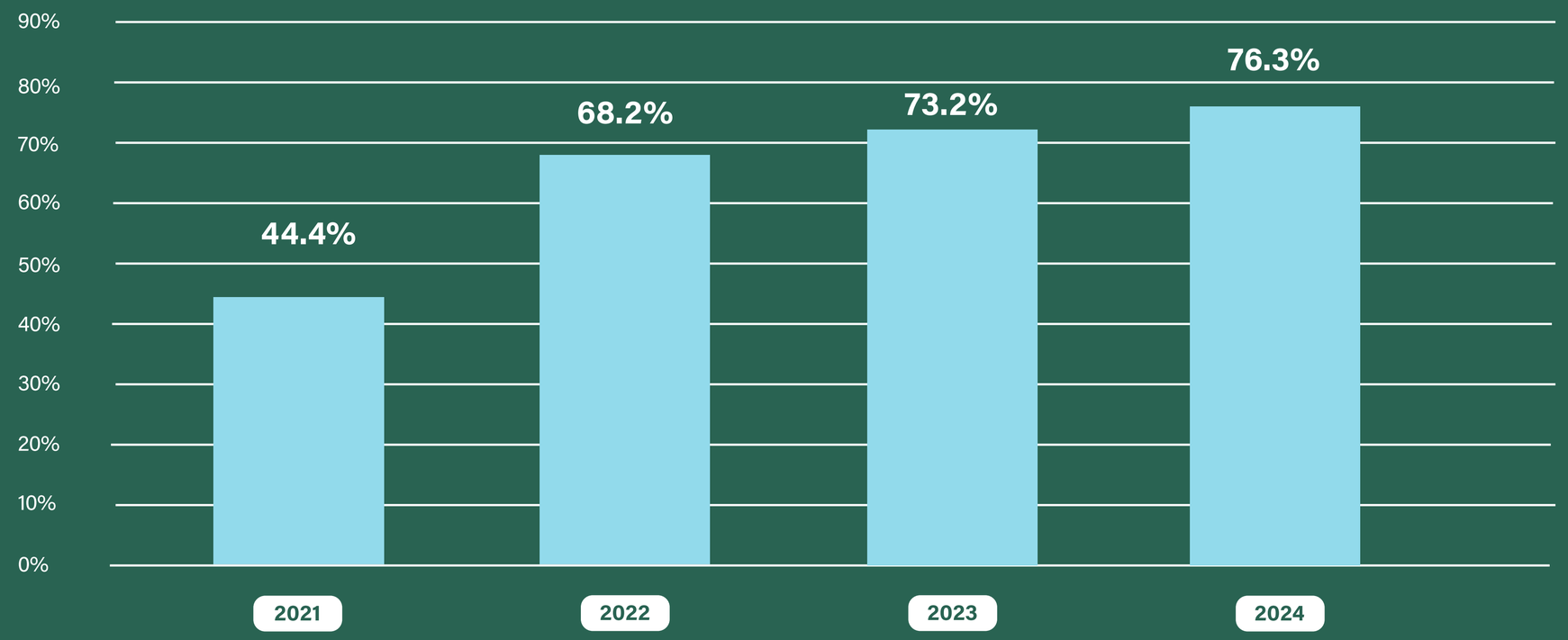


Tracking Conformance: From Availability to Use

The rapid growth in ZDHC Gateway-listed products signals strong alignment by chemical formulators with the ZDHC MRSL. But availability alone doesn't guarantee safer chemicals are being used in production. To assess real-world uptake, we look at supplier-reported data submitted through ZDHC's InCheck system.

InCheck has brought greater transparency to chemical use by allowing suppliers to submit inventories and assess their conformance with ZDHC MRSL requirements. This data provides valuable insight into how suppliers, particularly those connected to ZDHC Signatory Brands are performing when it comes to safer chemical use.

This chart shows data from suppliers who work with major clothing brands. This chart displays the percentage of chemical formulations suppliers used that meet the ZDHC MRSL requirements. Chemical formulations are used to wash and give colour to clothes (a good example is a detergent) that suppliers report using each month. The data comes from suppliers who have direct relationships with clothing brands and show steady improvement in using chemicals that meet safety guidelines.



What These Data Show

The numbers represent what suppliers tell us about their chemical use. While this data have some limitations, it doesn't show how much of each chemical is used, may have some duplicate entries, and doesn't include all types of chemicals, it still shows major progress in transparency.

Just 10 years ago, we had almost no visibility into what chemicals suppliers were using. Now we can track this information, which shows that industry standards and supplier practices are changing for the better.

How We Verify This Information

While suppliers report what chemicals they're using, we also test their wastewater twice a year to see what is actually being released into the environment. This testing acts as a reality check on the reported data.

The Bigger Picture

By combining what suppliers say they're using with what we find in environmental testing, we create a complete system for tracking chemical safety. This approach helps ensure that reported improvements in chemical use translate to real environmental benefits.

Consistent Compliance: A Foundation for Progress

In both the April and October 2024 testing cycles, over 70% of suppliers met all wastewater requirements for ZDHC MRSL substances – continuing a three-year trend of strong performance. This consistent compliance indicates widespread adoption of safer chemical practices and builds confidence in the sector's ability to drive continuous improvement.

The percentage of suppliers with at least one ZDHC MRSL parameter on alert rose slightly, from 19% in April 2022 to a peak of 26%, before declining to 23% by late 2024. Given the wide range of parameters tested and the strict detection thresholds, occasional alerts are expected. Rather than indicating failure, this rise in alerts reflects growing engagement and transparency, a positive shift toward openness, not just increased detection.

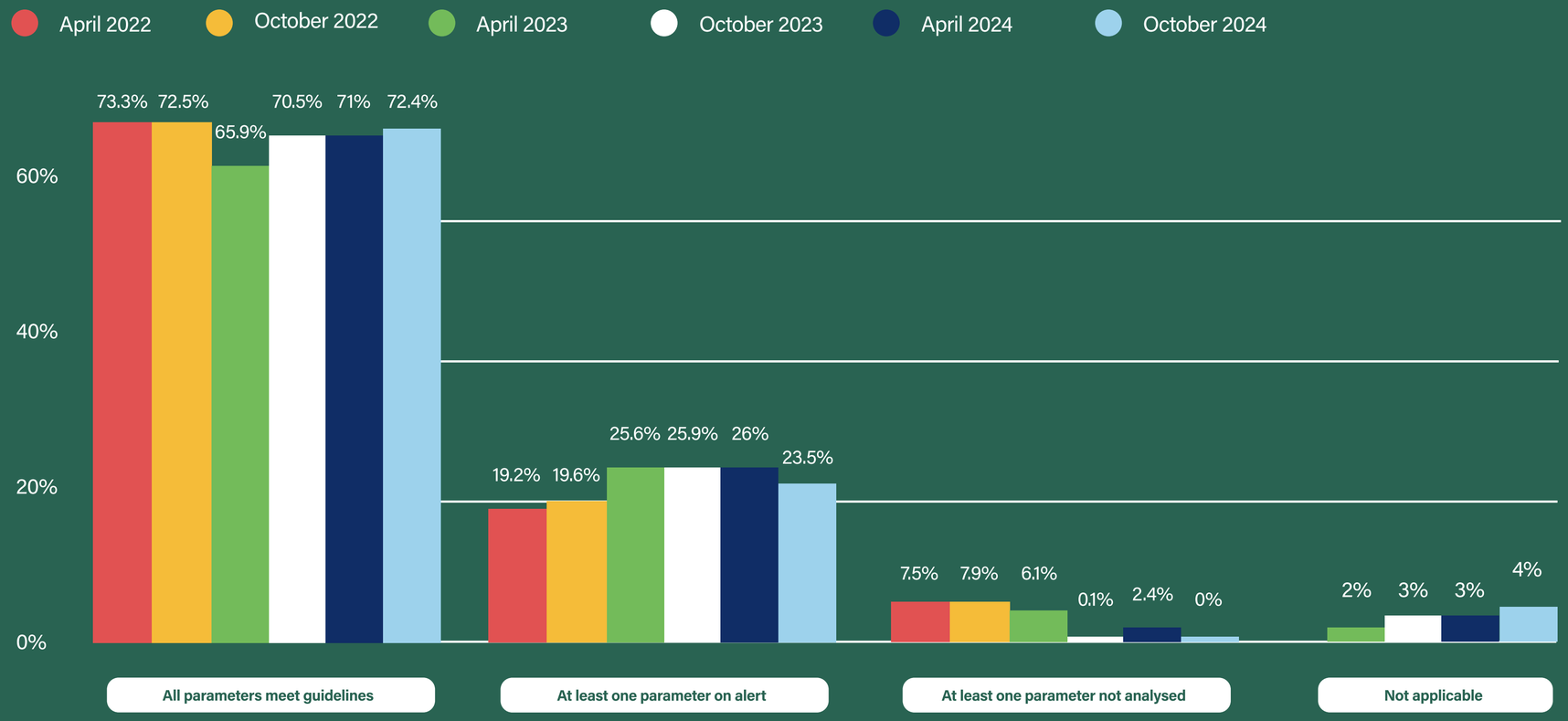
Encouragingly, **by April 2024, 100% of participating suppliers submitted complete wastewater analyses,** a clear sign of greater commitment to thorough testing and accountability.

We acknowledge that testing twice a year doesn't capture short-term or seasonal changes. Still, these data offer important insights into where risks persist and where further support is needed.

Before ZDHC, most suppliers lacked access to reliable input data or clear expectations on chemical use. The ZDHC Gateway has changed that. It has redefined what transparency and accountability look like in chemical management and made them achievable at scale.

Wastewater Conformance to ZDHC MRSL Parameters

Share of suppliers meeting all wastewater testing requirements, highlighting alignment with safer chemical use and growing environmental accountability.



Why Conventional Pollutants Matter: Protecting Aquatic Ecosystems

While hazardous chemicals are a significant concern, conventional pollutants such as Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), pH, temperature and colour also play a crucial role in water quality and ecosystem health.

- **COD:** High levels indicate the presence of organic matter that consumes oxygen during decomposition, leading to oxygen-depleted zones harmful to aquatic life.
- **TSS:** Excessive suspended solids can reduce light penetration, affecting photosynthesis in aquatic plants and can smother habitats, impacting fish and invertebrates. Also an indicator of microfibre release.
- **pH:** Extremes in pH can be toxic to aquatic organisms, affecting reproduction and survival rates.
- **Temperature:** Elevated temperatures can decrease dissolved oxygen levels and alter species composition by favoring heat-tolerant organisms over others.
- **Colour:** Discolouration can indicate the presence of dyes or other substances that may be harmful to aquatic life and can also affect the aesthetic value of water bodies.

Monitoring and managing these parameters are essential for maintaining healthy aquatic ecosystems and ensuring that wastewater discharges do not adversely affect the environment.

References:

1 EPA Aquatic Life CriteriaUS
https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table

2 EPA Effluent GuidelinesUS
https://www.epa.gov/eg/learn-about-effluent-guidelines

From Pollution Indicators to Ecotoxicity Impacts

Monitoring conventional wastewater parameters like Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), pH, temperature and colour provides essential insight into the broader water quality impacts of textile production. These indicators help identify where treatment systems may be underperforming, contributing to pollution that can degrade ecosystems, affect downstream users and harm public trust.

The graphic on the next page shows recent results from supplier wastewater testing across these parameters, offering a snapshot of current performance and areas where further improvement is needed.

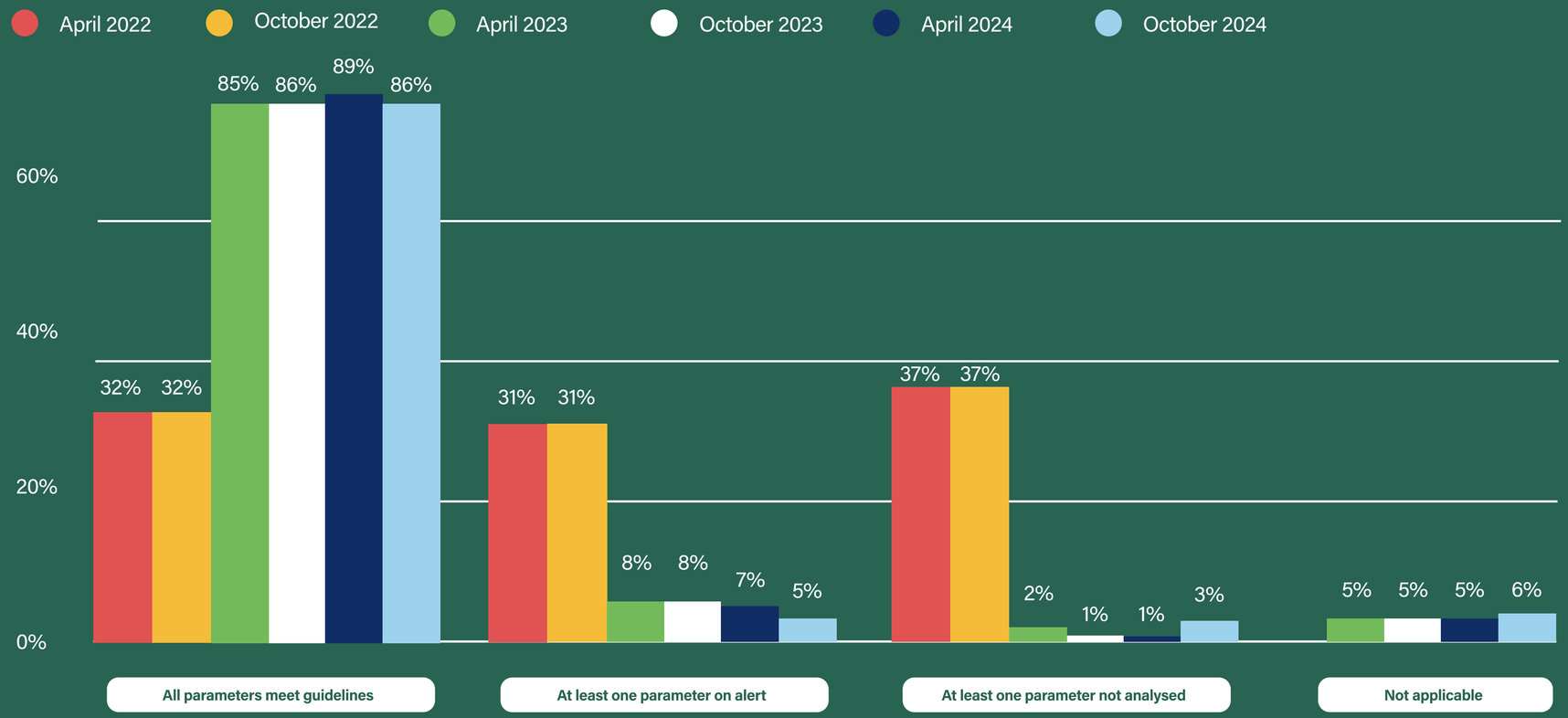
Yet while these measures track visible and physical pollution, they don't fully capture the toxic burden certain chemicals place on ecosystems. To understand that risk and reduce it, we must also assess freshwater ecotoxicity, which examines how chemical mixtures affect aquatic life.

In 2023, a marked improvement in supplier conformance to ZDHC Wastewater Guidelines for conventional parameters was observed. The percentage of suppliers meeting all conventional parameter guidelines rose from 32% in 2022 to 85–88% from 2023 onward, with performance remaining consistently high through April and October 2024.

This improvement is attributed to the implementation of Wastewater Guidelines V2.2, which now require testing only after effluent treatment. This change significantly reduced variability in results and enabled more facilities to meet the defined thresholds.

The following section highlights a joint study by ZDHC and Quantis, demonstrating how improved compliance with the ZDHC Wastewater Guidelines reduces both environmental toxicity and potential risks to human health.

Conventional Wastewater Parameters: Measuring Broader Pollution Impact



ZDHC Quantis A BCG COMPANY

Freshwater Ecotoxicity: How Cleaner Chemistry Protects Aquatic Life

How Safer Chemistry Protects Aquatic Life

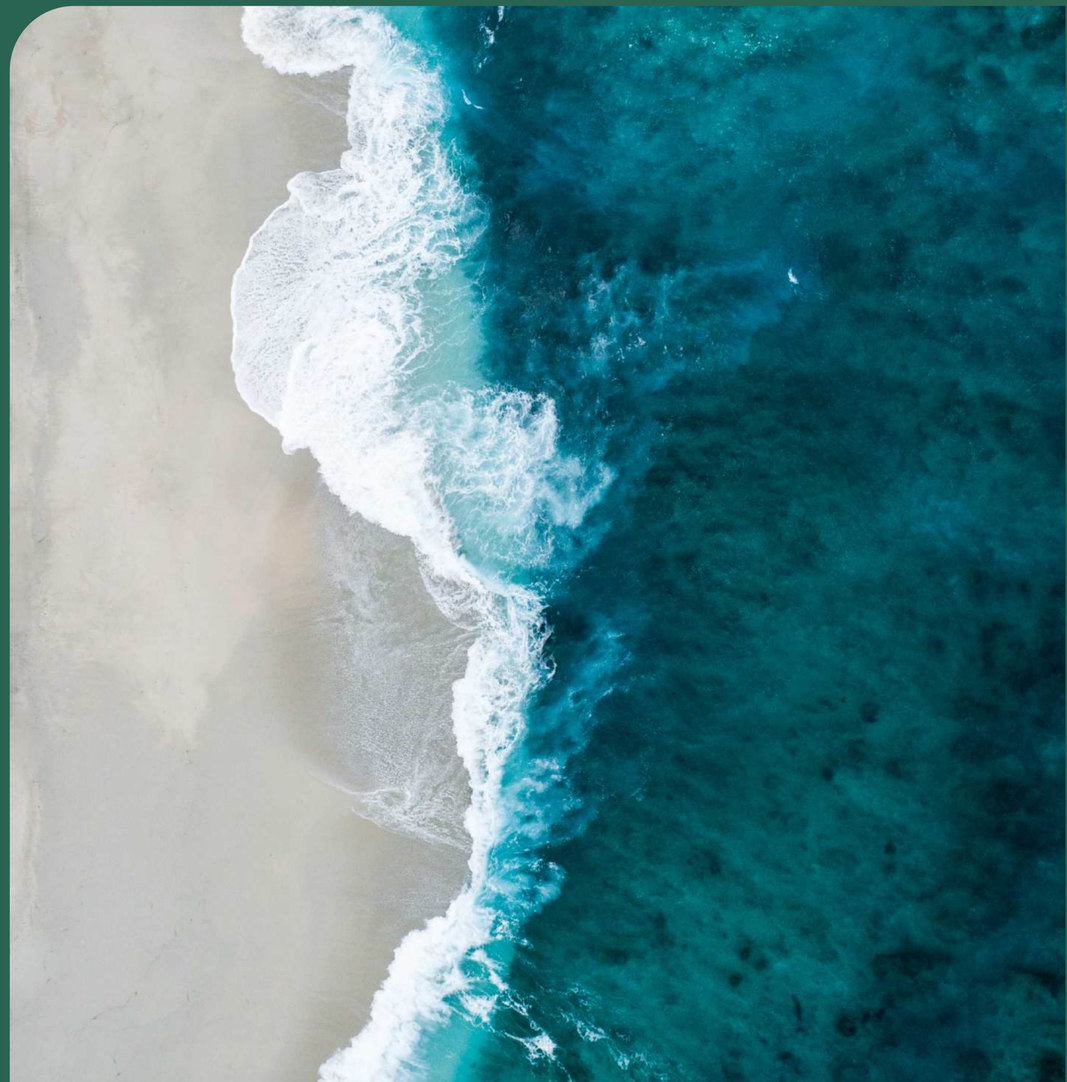
ZDHC partnered with sustainability consultancy Quantis to assess how safer chemical use and improved production practices reduce harm to both nature and people. Using models based on the EU Product Environmental Footprint (PEF) framework, the analysis focused on five key impact areas, including freshwater ecotoxicity and human health toxicity (non-cancer), to measure the benefits of ZDHC-aligned chemical substitution, wastewater treatment and air emissions control.

This section highlights the results related to freshwater ecosystems, showing how better chemical input management and treatment processes reduce toxic releases into rivers, lakes and wetlands. The subsequent impact section will focus on human health outcomes, using the same methodology.

Three Ways We Measured Impact

To understand how ZDHC-aligned practices improve freshwater quality, Quantis applied three methods:

- **Case Studies on Chemical Substitution**
  We examined how switching out toxic chemicals for safer alternatives reduced the impact on aquatic life.
- **Wastewater Impact Assessment**
  We analysed how different wastewater treatment levels – Foundational, Progressive and Aspirational – affected pollution levels in discharged water.
- **Air Emissions Assessment**
  We assessed how reducing volatile organic compound (VOC) emissions also benefits freshwater ecosystems via indirect pollution pathways (e.g. atmospheric deposition).



What the Data Show: Real Reductions in Freshwater Toxicity

Replacing Nonylphenol Ethoxylates (NPEOs) in Wetting Agents

NPEOs, a type of non-ionic surfactant, breaksurfactant break down into nonylphenol, a pollutant that harms aquatic organisms and doesn't break down easily.

- Freshwater toxicity decreased by 51% when switching to fatty alcohol ethoxylates.
- There was a modest 21% increase in climate impact due to dosage and production footprint.

Why it matters: Surfactants like NPEOs are among the most common sources of aquatic toxicity in wet processing. Substituting safer ingredients is a major win for rivers and lakes.

Improving Wastewater Treatment

Using the World Apparel and Footwear Life Cycle Assessment Database (WALDB), we modeled toxicity levels in wastewater under ZDHC's three treatment tiers:

- Progressive Level facilities decreased freshwater ecotoxicity by 65% compared to Foundational.
- Aspirational Level facilities decreased freshwater ecotoxicity by 86%.

Why it matters: The biggest improvements came from reducing heavy metals – especially lead, cadmium and chromium – substances that are toxic to fish and invertebrates at extremely low levels.

Targeted Copper Removal in India

A facility using a copper-based dye implemented a new treatment process:

- Freshwater ecotoxicity decreased by 13%

Why it matters: Even when a dye is technically compliant, the metal content can overwhelm local water bodies. Targeted removal methods, like alkaline precipitation, make a measurable difference.

Chlorinated Phenol Dye Substitution in China

A dye contaminated with PCP and TeCP, two highly toxic substances, was replaced.

- Freshwater ecotoxicity decreased by 8%.

Why it matters: A single ingredient switch made a meaningful difference in a facility where all other parameters were compliant. Small changes can yield big results.

Reducing Volatile Organic Compound (VOC) Emissions in Factories

Air pollutants don't stay in the air. Many VOCs end up in water through rain or dry deposition. After abatement system installation:

- At a coating facility in Vietnam, freshwater ecotoxicity decreased by 91%.
- At a tanning facility in India, freshwater ecotoxicity decreased by 64%.

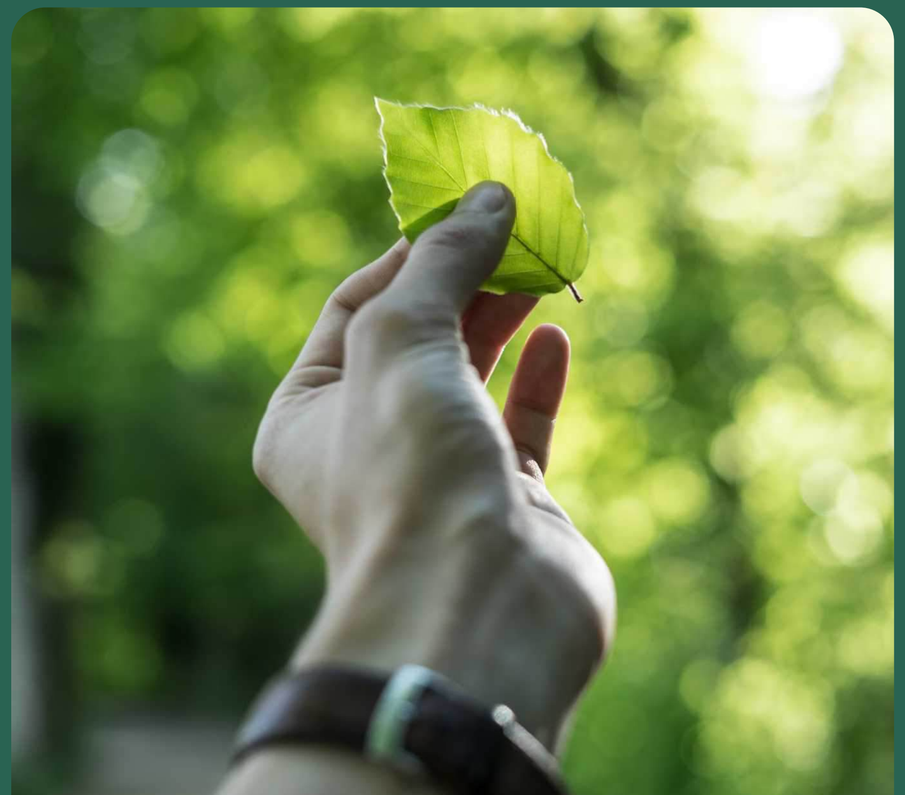
Why it matters: Even air emissions can harm freshwater ecosystems. Cleaner air means healthier water.

Looking Ahead

While these case studies focused on heavy metals and a few chemical types, the impacts are clear and they're measurable. As we expand to include more substances on the ZDHC MRSL, we will continue building the science behind safer chemistry to protect aquatic ecosystems and the communities that rely on them.

Spotlight

Behind the Data: A Q&A with Quantis Environmental Experts



Quantis Germany experts Nicolas Loz De Coëtgourhant (Climate and Nature Lead) and Kyle Orritt (Sustainability Senior Project Manager) share insights from their collaboration with ZDHC on measuring the environmental and health impacts of improved sustainable chemical management in textile manufacturing.

Q: Can you walk us through your methodology and how you used the World Apparel and Footwear Life Cycle Assessment Database (WALDB) database to approach these two studies?

Nicolas: The overall methodology we developed has been very innovative because right now, the most advanced frameworks that exist to assess companies' impact on nature only take into account a very restricted part of pollution – mostly pollution from agricultural practices through nitrogen and phosphorus – and exclude the impact of chemical pollution. So having this big loophole is really something missing in the nature strategy of big companies today.

Kyle: We had to leverage secondary data sources like our own proprietary WALDB database because of data gaps, constraints and transparency issues. The database was originally developed for lifecycle assessment and product carbon footprint work, but it was very useful because we applied an LCA methodological approach to parts of this study to make the extrapolations we needed.

Nicolas: Through ZDHC and the different methodologies they've put together, we asked: how does this contribute to filling this loophole? What's the value proposition of the MRSL? We collected comprehensive case studies with primary data, and when we didn't have primary data, we leveraged our own database. Then we added another layer – taking into account the local state of nature. By combining both the pressure that companies release into nature and the local environmental conditions, you can have a comprehensive vision of the actual local impact on nature of a factory's chemical releases.

Spotlight

Q: Why did you focus specifically on heavy metals, and what would be the value of expanding to other chemical categories?

Nicolas: We had two main parameters that drove our choices. First was the materiality of the pollutants for the textile industry: we wanted to focus on something that matters at the sector level. Second was data availability, mixing both primary and secondary data to find the best cases that were robust and material enough to represent something at industry level.

Kyle: Indeed, data availability was key. We didn't want to rely extensively on secondary data and where we could, we wanted to work with primary data. You may be aware of very problematic chemicals like PFAS, which are highly material, but the key challenge is data availability. People haven't been tracking them, or they're changing very quickly. You get a new PFAS every week with new properties.

I would actually argue that heavy metals are probably not the most common hazardous substances anymore. They have a lot of bad press and have been regulated for a long time, so they're more mature. Whereas chemicals like PFAS that really took off in the last 30-40 years are much less studied, so the long-term effects aren't as well known. Having something more standardised across different chemical types would be much more balanced and proactive rather than reactive, instead of waiting 20 years to see what problems a chemical causes and then phasing it out.

Q: What are the biggest barriers preventing better data sharing, and how can they be overcome?

Nicolas: I'd say it's twofold. First is the ability to collect data: it costs money and if you want something reliable, you need regular data points because frequency matters. The necessary investment to have robust data is significant. And then there's scale, we're talking about hundreds or thousands of chemicals, so there needs to be homogeneous guidelines about what needs to be checked.

The second point is confidentiality and willingness to share. Here, I think ZDHC, as a non-profit and as an industry convener, can facilitate and help companies to share data more broadly, to help build joint databases and to anonymise data in order to facilitate this sharing. That will, in the end, benefit the whole industry. I think ZDHC is particularly well positioned to play a role here as a trusted intermediary.

Q: Given what you worked on and the data you had, what would you wish for in future studies?

Kyle: There could be a lot more data related to nature indicators in life cycle assessments (LCA), and indicators that relate to the local states of nature. Another big one is more information on chemical formulations. Rightfully so, there's intellectual property surrounding that, but if there was a standardised way of informing players that we need specific information without impacting confidentiality, that would be very helpful.

Nicolas: We'd also like to see data collected before any change has been made. Most of the secondary data we have is already aligned with the Foundational Level of the ZDHC MRSL, which means we don't have the ability to see the gap with current practices still ongoing in many places. This ability to collect baseline data would show how much the ZDHC MRSL actually helps reduce negative impact locally. But what's great is that even in this state of data scarcity, we can still make the case that adopting the MRSL brings a quantifiable reduction of a company's negative impact on nature. For companies that don't know how to act on chemical pollution, this is a no-regret action – even with imperfect data, the MRSL will definitely help reduce their negative footprint on nature. Companies shouldn't wait for perfect data; they can take action right now.

Nicolas Loz De Coëtgourhant
Climate and Nature Lead Quantis

Kyle Orritt
Sustainability Senior Project Manager Quantis

Spotlight

Why Fibre Pollution Still Matters

Even when we limit the most harmful chemicals in textile production through the ZDHC MRSL, the risk to the environment doesn't stop at the factory gate. Tiny fibres, both synthetic and natural, are released during manufacturing, washing and wearing. These fibres can carry leftover chemicals into rivers, lakes and oceans.

And it's not just synthetic fibres. Natural fibres like cotton or wool, once treated with dyes or water-resistant finishes, can also cause harm. While the ZDHC MRSL blocks the worst chemicals from being used, some approved substances can still remain on fibres and we don't yet fully understand their long-term environmental effects.

That's why ZDHC follows the precautionary principle: if there's uncertainty about harm, we aim to prevent it anyway. One way we do this is by reducing fibre shedding from the start, through better material design, smarter processing and improved factory practices.

Research shows that measuring Total Suspended Solids (TSS) in wastewater helps track fibre pollution. TSS includes these tiny particles, and higher levels often mean more fibre shedding. The good news is that well-run wastewater treatment plants can remove many of these fibres, especially from synthetic materials, before they reach the environment. This helps cut down on microplastic pollution, a growing concern for both ecosystems and human health.

That's why ZDHC is working closely with The Microfibre Consortium. Together, we're building better ways to measure and reduce fibre release across the entire life of a product, from factory to washing machine to final disposal.

Spotlight

Spotlight on the Microfibre Consortium: Uniting for Impact

ZDHC and The Microfibre Consortium Join Forces

The Microfibre Consortium (TMC) leads the textile industry in mitigating fibre fragment loss and release to protect the environment. They've developed test methods and practical tools for the textile industry, helping turn microfibre pollution from an invisible problem into something we can measure and mitigate.

The integration of a fibre fragmentation in wastewater indicator into the ZDHC Wastewater Guidelines, through collaboration between ZDHC and TMC marks a groundbreaking advancement. This partnership brings together two influential sustainability initiatives, uniting the industry behind a single, cohesive approach. By incorporating TSS and implementing actions to meet the ZDHC Wastewater Guidelines, textile facilities can systematically reduce fibre fragment contamination. This collaboration significantly reduces reporting, testing and audit fatigue for textile facilities while providing clarity and consistency in sustainability efforts. Their joint endorsement ensures reliable data collection and ultimately strengthens industry-wide efforts to combat fibre fragment pollution.

The collaboration between ZDHC and The Microfibre Consortium exemplifies how targeted partnerships can translate scientific insight into practical action, transforming an invisible environmental threat into measurable and manageable outcomes. This same model of alignment underpins our work with Textile Exchange, where sustainable chemistry is linked to sustainable materials. Together, these efforts demonstrate a shift from isolated interventions to integrated strategies that embed chemical responsibility across both fibre processing and fibre production. Whether addressing fibre fragments in wastewater or chemical inputs in recycled and regenerated fibres, ZDHC is driving coherence across the value chain. By linking measurable outcomes, like TSS for microfibre pollution and ZDHC MRSL conformance for raw material inputs, we are strengthening the industry's ability to reduce harm at every stage of the textile lifecycle.

> "This collaboration continues to turn environmental progress into reality in the textile industry – by introducing a practical indicator for fibre fragmentation in wastewater, but we're also making real advancements towards reducing it. Uniting science with industry action, we can drive accountability to make meaningful change to protect our environment."

Dr. Kelly Sheridan

Chief Exectuive Officer
The Microfibre Constortium

Spotlight

Spotlight on Textile Exchange: Partnering for Progress

Sustainable Chemistry Takes Centre Stage in Material Matters

A groundbreaking partnership between ZDHC and Textile Exchange sets new chemical management standards for dissolved pulp and recycled polyester production, marking a significant advancement for industry sustainability.

By establishing rigorous criteria and comprehensive guidelines, the initiative ensures that the manufacturing processes for dissolved pulp and recycled polyester prioritise chemical recovery, wastewater management and reduction of air emissions. Notably, the ZDHC Recycled Polyester Guidelines V1.0 include transparency requirements for feedstock sourcing, signalling to the industry that the ZDHC initiative is interested in expanding the scope of the ZDHC MRSL to include recycled polyester.

This project represents an important milestone for both ZDHC and Textile Exchange, as it demonstrates collaboration between these leading organisations to align industry requirements and drive collective action towards more responsible chemical management. This integration helps stakeholders meet global sustainability targets by promoting best practices in chemical management, driving innovation in material recycling technologies and fostering a safer and more sustainable supply chain. As a result, Textile Exchange's Material Matters Standard provides brands, manufacturers and consumers with greater assurance that products are produced sustainably, safeguarding both people and the planet.

> "The collaboration between Textile Exchange and ZDHC marks a significant milestone. By integrating ZDHC fibre guidelines into Textile Exchange's Materials Matter Standard, we demonstrate our commitment to aligning industry standards and reducing audit fatigue.
>
> ZDHC has expanded its scope to cover fibre production, addressing the environmental impact of fibres. The initial focus is on man-made cellulosic fibres, dissolving pulp and recycled polyester guidelines. These latest ZDHC guidelines make a substantial contribution to the first stage of processing."

Gweneth Langdon

Standards Director
Textile Exchange

What Do These Impact Terms Mean — and Why Do They Matter?

To measure the real-world impact of chemicals, we use a few key scientific terms. Here's what they mean in plain language and how they connect to ZDHC's Nature Impact Areas.

These indicators help us measure how cleaner chemical choices support ZDHC's goal of protecting people, water and biodiversity — not just within the factory, but throughout the planet's connected ecosystems.

Impact Area	Description	Nature Impact Area
Human Health Toxicity	How likely a chemical is to harm people through skin contact, inhalation, or ingestion of contaminated water/food.	Worker Health and Community Well-Being
Freshwater Ecotoxicity	Toxicity to aquatic life (fish, plants, microorganisms) in rivers, lakes, and wetlands	Biodiversity in Freshwater Ecosystems
Nutrients	Nitrogen and phosphorus are essential in small doses but become pollutants in excess.	Excess nitrogen and phosphorus lead to eutrophication of water bodies
Freshwater Eutrophication	Excess nutrients trigger algae blooms in rivers/lakes, consuming oxygen and harming aquatic life.	Water Quality and Ecosystem Balance
Marine Eutrophication	Nutrients flowing into seas cause oxygen-depleted coastal "dead zones."	Ocean Health and Ecosystem Function

Societal & Health Impact

Human-Centric Outcomes

How the ZDHC MRSL Approach to Using Safer Chemistry Protects People

From the beginning, ZDHC has worked to shift the fashion industry away from cleaning up pollution after it happens, to preventing harm before it starts. By eliminating hazardous chemical inputs through the ZDHC MRSL, we help protect factory workers, surrounding communities and the broader public from exposure to substances that can harm human health.

Building on the modelling introduced in the ecotoxicity section above, this chapter highlights how ZDHC-aligned practices reduce human toxicity risks, focusing on non-cancer impacts from chemical exposures via water, air and workplace contact.

Three Ways We Measured Impact

To understand how safer chemistry reduces risks to people, Quantis applied three approaches:

- **Case Studies on Chemical Substitution**
  We analysed how switching from hazardous chemicals to safer alternatives affects human toxicity outcomes, especially for workers and downstream users.
- **Wastewater Impact Assessment**
  We assessed how improved wastewater treatment reduces chemical exposure risks to surrounding communities and downstream populations.
- **Air Emissions Assessment**
  We modelled how reducing VOC emissions to ZDHC thresholds lowers the risk of exposure through inhalation and environmental accumulation.

What The Data Show: Real Reductions in Freshwater Toxicity

Eliminating DMFa in PU Coated Materials

Human toxicity (non-cancer) risks were **eliminated**, as DMFa was removed entirely.

- Additional benefits included a **45% reduction** in climate impact and **95% less water use.**

Why it matters: This change removes the source of worker exposure rather than managing it downstream. It also shows how chemical substitution can yield workplace safety and environmental benefits simultaneously.

Improving Wastewater Treatment

Using industry-specific data from the WALDB database, Quantis assessed the impact of improved wastewater treatment on human toxicity (non-cancer). Moving from ZDHC's Foundational to Aspirational Levels resulted in:

- Human health toxicity **decreased by 95%**.

Why it matters: Facilities that manage both inputs and treatment effectively reduce chemical loads in discharged water, minimising exposure for nearby communities and the broader public.

Removing Chlorinated Phenols from Dyes in China

At a facility in Suzhou, a specific dye was found to contain **pentachlorophenol (PCP)** and **tetrachlorophenol (TeCP)** - both highly toxic, persistent, and bioaccumulative. Substituting the dye with a cleaner formulation led to:

- Human toxicity (non-cancer) **decreased by 74%.**

Why it matters: Even within otherwise compliant systems, hidden contaminants in chemical formulations can pose disproportionate risks. Targeted substitutions can make a significant impact.

Reducing VOC Emissions in Factories

VOC emissions can enter the body through inhalation and settle into local environments. Quantis modeled facilities that installed regenerative thermal oxidisers to meet ZDHC air emission thresholds. The results:

- At a coating facility in Vietnam, human toxicity (non-cancer) **decreased by 90%.**
- At a tannery in India, human toxicity (non-cancer) **decreased by 64%**.

Why it matters: These changes directly reduce occupational and local community exposure to solvents and air pollutants linked to health risks.

Looking Ahead

As ZDHC continues to promote the adoption of safer chemistry, the evidence is clear: real-world reductions in human health risk are achievable - and measurable. By combining smart chemical substitution with good process control, the fashion and footwear sectors can protect the people who make, wear and live near where products are produced.

Spotlight

Advancing Health and Equity through Sustainable Chemical Management

As ZDHC continues to strengthen the link between chemical management and human well-being, we know that exposure to hazardous substances does not affect all people equally. Gender plays a critical role in how chemical risks are experienced, both in the workplace and in surrounding communities. Women, in particular, are often more vulnerable to chemical exposure due to biological, social and economic factors, and yet their experiences have historically been underrepresented in industry decision-making.

Building on our MRSL-driven approach to eliminate harmful chemicals at the source, ZDHC has launched a dedicated Gender & Chemicals Workplan (2025–2027) to ensure that gender-specific risks are considered as part of sustainable chemical management. This initiative is an essential extension of our mission to protect people, aiming to integrate equity into the foundation of our practices.

> "We know that chemicals can be harmful to human bodies. We often know if something is an endocrine disruptor or carcinogenic. But we don't always look at how the chemicals impact who in more detail."

Mariella Noto

Academy Director
ZDHC Foundation

Breaking New Ground: ZDHC's Partnership on Gender and Chemicals

When ZDHC CEO, Frank Michel, travelled outside Europe to observe textile industry operations, something caught his attention: the stark gender divide in different work areas. This observation sparked a crucial question for the ZDHC: how does gender intersect with chemical management and what role could ZDHC play in addressing these themes?

For Mariella Noto, ZDHC's Academy Director – and sociologist at heart – working in an industry dominated by technical chemical management, this question resonated deeply. "I'm always focusing more on how we're impacting the workers that are in the facilities," she explains, describing her natural inclination to focus on the human element.

ZDHC began exploring different options where they could contribute meaningfully while staying connected to their core work in chemistry. This search led them to an organisation developing a gender and chemicals roadmap supported by the German Environment Agency and the German Environment Ministry. "We thought, that's interesting, that brings the topic of gender and chemicals together already," Mariella recalls. "So, we're not creating something new, but we're able to add to a programme that already exists." After discussions about potential collaboration, a formal partnership was established. The initiative was officially launched at the SAICM (now GFC) conference in Bonn in 2023, where a resolution was adopted requiring member states to work toward gender and chemicals action plans. ZDHC became a founding member and board member of this groundbreaking partnership that will support the development of a Gender Action Plan for the Global Framework on Chemicals, with the objective of mainstreaming a gender perspective in the implementation of the GFC globally.

Where Industry, Science and Human Impact Meet

ZDHC stands at a unique crossroads where the textile industry, chemical management and worker safety converge. This positioning gives ZDHC a valuable perspective on gender and chemicals that many other organisations may lack.

What makes ZDHC's contribution especially valuable is their direct connection to on-the-ground realities. "We're working with brands and suppliers directly on chemical management and we are gathering data on chemical substances" she explains. This allows them to collect information about who is working with which chemicals and how they're processing them, while simultaneously gathering toxicity data.

Spotlight

The opportunity lies in bringing these data sets together. Understanding both the chemicals and who is working with them could potentially inform better decision-making around procurement policies and chemical usage. ZDHC's established relationships with stakeholders across the textile industry, including the chemical industry itself, position them to bridge crucial gaps.

The Power of Collaboration

The collaborative aspect of the Gender & Chemicals Partnership has been particularly meaningful. At their first assembly last fall, participants from diverse backgrounds and perspectives came together for two days of constructive work.

"Everybody has their own area of knowledge and their own field of expertise," Mariella reflects. "There are a lot of different opportunities to learn from each other." Despite the cultural differences among participants, a unified energy emerged. "Everybody is very passionate about the topic," she notes, describing the "intense collaborative spirit" that characterised the gathering.

For Mariella, one of the most humbling aspects was realising how ZDHC is perceived by others. "A lot of the partners said, 'Yes, but we need to have ZDHC in here with the knowledge and the example they have been able to create for the textile industry,'" she recalls. This recognition of ZDHC as a role model for other industries was both surprising and affirming.

"We often still see ourselves as going from startup towards a grown-up organisation," she admits. "But we're seen as the role model for other industries. That's where we are right now."

Practical Considerations on the Ground

The Gender & Chemicals Partnership is currently focused on two main work streams: data and knowledge management and training and education.

"We identified that the amount of research around this topic is almost zero," Mariella explains regarding gender and chemical data. This knowledge gap makes their work all the more essential.

On a practical level, there are often overlooked gender considerations in chemical safety. Mariella offers a simple but powerful example: "Gloves and boots and overalls are given out but not thinking of the fact that it might be way too big for a female worker." When protective equipment doesn't fit properly, chemicals can leak in, leading to exposure.

Cultural factors also influence safety practices. Some male workers avoid using protective equipment because they believe they're "tough enough" or "won't be impacted," resulting in unnecessary exposure to harmful substances.

Both issues highlight the need for a more nuanced, gender-aware approach to chemical management, one that considers not just the chemicals themselves, but the diverse humans working with them.

Looking to the Future

For Mariella and ZDHC, the ultimate goal is concrete impact. She hopes to integrate the knowledge gathered through this partnership to "directly support workers and their management to make the right decisions around health and safety."

In an industry that can often feel abstract and technical, the opportunity to create tangible improvements in people's lives is especially meaningful. By bridging the gap between chemical data and human realities, ZDHC and the Gender & Chemicals Partnership are poised to set new standards for health and safety that recognise and respond to gender differences, potentially creating a model that extends far beyond the textile industry.

Chapter 5

Reaching Out: Events in 2024

Events in 2024

ZDHC events offer a lively forum where our global community connects to share knowledge, gain valuable insights and build meaningful relationships.

With over 1400 participants across five major regional conferences spanning four continents, these gatherings – from Shanghai to Amsterdam, Chennai to Milan – not only showcased remarkable implementation success stories but also strengthened the foundation for ambitious industry-wide transformation going forward.

Throughout these events, ZDHC also conducted specialised sessions for chemical manufacturers to share innovations, textile manufacturers to exchange best practices and brands to understand their role in sustainable chemical management.

> “Our events are more than gatherings, they are strategic touchpoints that unite our global community, foster collaboration and accelerate progress towards safer, more sustainable chemical management. By bringing diverse stakeholders together, we create the momentum and shared vision needed to drive meaningful industry transformation.”

Lydia Lin

Chief Implementation Officer
ZDHC Foundation

Key 2024 Events

May 2024:

Dhaka Conference in Bangladesh focused on building a sustainable chemical management culture in the fashion industry.

June 2024:

ZDHC Impact Day and Convention Week in Amsterdam featured filmmaker Roger Williams presenting “River Blue,” updates from CEO Frank Michel and CIO Scott Echols and the announcement of a significant collaboration between ZDHC, SCTI, and bluesign.

Key 2024 Events

September 2024:

The South Asia Regional Conference in Chennai brought together participants from India, Bangladesh, Pakistan, Sri Lanka, Indonesia and Thailand, with special recognition given to Hayleys Fabric PLC, Jay Chemicals and others through the ZDHC Torchbearer Awards.

October 2024:

The Türkiye Regional Conference was held virtually, providing a comprehensive overview of ZDHC's 2024 activities and future plans.

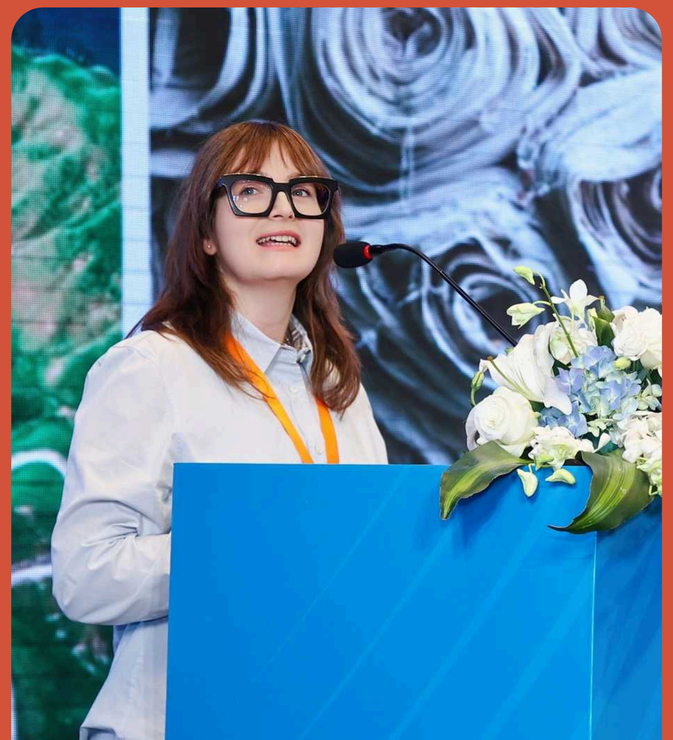
November 2024:

The Southern Europe Regional Conference in Milan at Sistema Moda Italia offices, featuring workshops on sustainable chemical management in metal components and footwear manufacturing.

Key 2024 Events

December 2024:

The ZDHC Solutions Conference in Shanghai showcased sustainability innovations and case studies demonstrating the impact of ZDHC's guidelines on reducing environmental footprints and improving worker safety.



Chapter 7

Final Remarks

A Decade of Transformation

As we mark ZDHC's 10th anniversary, we reflect on a transformative journey that began with a paradigm shift – moving the industry from end-of-pipe solutions to proactive chemical input management through our Manufacturing Restricted Substances List (MRSL). This revolutionary change in approach has not only redefined industry standards but has created ripple effects across interconnected challenges that we keep front and centre: water stewardship, worker safety and ecosystem protection.

Global Reach, Local Impact

Sustainable chemical management knows no borders. The challenges we address are fundamentally global, demanding a worldwide approach with locally tailored solutions. Our expansion to five strategic regional hubs, with new operations in Türkiyeand Brazil complementing our established presence in Asia and Europe, reflects this reality. Chemical supply chains span continents and our impact must do the same. This demonstrates our commitment to meeting partners where they are. In 2024, we delivered over 150 events, reaching more than 17,000 participants in 10 languages, proving that sustainable chemical management must be at once global and local in order for it to be successful. This on-the-ground approach has enabled deeper engagement with local manufacturing communities and accelerated the adoption of safer practices where they matter most.

Evidence of Forward Progress

The data confirms that our approach is delivering meaningful change. Supplier performance on ZDHC MRSL conformance continues to advance, with **70-73%** of suppliers consistently meeting wastewater requirements for all ZDHC MRSL parameters. The **31.6% growth in registered chemical products** on the ZDHC Gateway from 2023 to 2024 reflects deeper engagement from formulators and provides the supply chain with more verified, sustainable alternatives. Meanwhile, our **Signatory Community has grown to over 350 members**, reinforcing a global movement that unites brands, suppliers and formulators around shared standards and collective action.

Our Nature Strategy

This year, we refined our impact measurement framework to connect strategy with outcomes across four dimensions: **Activity-Based Impact, Transformation Impact, Nature Impact, and Societal and Health Impact**.

By integrating science-based indicators, such as reductions in human toxicity and freshwater ecotoxicity, with real-time monitoring and stakeholder adoption, we are bridging the gap between chemical management and environmental performance.

This multidimensional approach moves us closer to a supply chain that respects **planetary boundaries** while protecting the health of workers, communities and ecosystems.

Collaborations Drive Systemic Change

Our partnerships with like-minded organisations such as The Microfibre Consortium and Textile Exchange have expanded our reach into environmental challenges that range from microfibre pollution to fibre production.

The Path Forward to 2030

As we look toward our ambitious 2030 goals, we recognise both progress made and challenges ahead. The journey to 100% ZDHC MRSL conformance within our community requires continued focus on supplier engagement, simplified frameworks and measurable impacts. Our newly streamlined Sustainable Chemical Management Framework and Supplier Roadmap to Zero exemplify our commitment to making sustainable practices more accessible and easy to use.

The ZDHC MRSL changed the conversation. Now, together with our Signatory Community, we are changing the industry itself: building a future where better chemistry leads to the protection of life, land, air and water. This is not just an aspiration; it's a transformation already underway, driven by the collective power of a global movement united by a single purpose: to reach zero discharge of hazardous chemicals in our lifetime.

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