



# **THE ROAD TO PFAS FREE**

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**GREEN PAPER SERIES**

**THE KEEN EFFECT  
OPEN SOURCE INITIATIVE**

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# FOREWORD

BY ARLENE BLUM

In 1970, I co-led the first all-women’s ascent of Denali, the highest mountain in North America. After reaching the top of this Alaskan giant, our team brought our unconscious leader down safely from just below the summit and then withstood a fierce Arctic storm—all without any of the “benefit” of harmful, water-repellent chemicals that contained PFAS chemicals in our boots, clothing, or gear. Then, in 1978, I led the first American and all-women ascent of Annapurna I—considered the most difficult and dangerous of the world’s highest mountains. This demanding ascent was also made without any PFAS chemicals as far as I know. Fast-forward nearly half a century, and PFAS chemicals are being found in a wide variety of consumer products, including clothing and gear designed for healthy outdoor adventures. Recently, it hasn’t seemed possible to summit Denali or Annapurna without PFAS-treated gear.

Happily, change is coming. In 2008, when I founded the Green Science Policy Institute in order to stop the use of toxic chemicals in everyday products, the harms caused by PFAS were not generally known. Since then, we’ve learned a great deal about the adverse health effects of thousands of related PFAS. Worse yet, PFAS are “forever chemicals” that do not break down in the environment—ever! KEEN reached out to us at the Green Science Policy Institute while they were on their own long journey to remove all PFAS from their footwear. At that time, my requests to the outdoor industry to phase out the entire class of PFAS were having a limited response. I was delighted that this family-owned footwear brand was committed to stopping the use of PFAS in their products.

After four years of research, experimentation, and investment, KEEN succeeded in eliminating PFAS from their entire product line. And then, commendably, they decided to share what they learned so other outdoor brands could stop using these chemicals as quickly and economically as possible. I congratulate KEEN for their early recognition of the dangers of PFAS, for their continuing leadership toward better products, and for publishing this very useful Green Paper for an easier and faster journey to building PFAS Free and functional products. Removing PFAS forever chemicals is daunting, but doable. Now with legislation being implemented worldwide to stop the use of PFAS, and with brands like KEEN leading the way, the outdoor industry is moving away from PFAS. This joint expedition, for me, is reminiscent of climbing a Himalayan giant. We assemble a team with the goal of protecting our health and environment from PFAS and other toxic chemicals. And then we climb steadily upwards, overcoming storms, avalanches, and an occasional Yeti along the way, toward the summit of a healthier world.

*Arlene Blum PhD., biophysical chemist, author, and mountaineer, is Executive Director of the Green Science Policy Institute and a Research Associate in Biology at UC Berkeley. Blum’s research and policy work has contributed to preventing the use of harmful chemicals in children’s sleepwear, furniture, electronics, and other products worldwide. Her current “mountain” is to educate decision-makers and the public to reduce the use of PFAS and other entire classes of harmful chemicals in everyday products.*



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# INTRODUCTION

We love making the most original, purposeful, comfortable, and durable footwear on the planet, but we really just want to make a difference. As a family-owned and values-led business, we've always felt we have a shared responsibility to do things the right way. The kind of products we make and how we treat our environment and each other are part of a mission we've taken to heart since KEEN was conceived in 2003. Our fifth brand value, or marker as we call them, is to create with conscious.

## CONSCIOUSLY CREATED

Is it possible to create products that don't harm the planet? We think it is and we're taking steps to do so. We call it "Consciously Created", and it's one of our brand values, or "markers" as we call them.

It involves being more conscious of the choices that go into making a product and doing everything we can to have a more positive effect on humankind and our planet. It's about rethinking the status quo and doing things differently by acting on our values.

Consciously Created is comprised of four pillars: Harvest Materials, Source Ethically, Make to Keep, and Detox the Planet.

## DETOX THE PLANET INITIATIVE

In 2014, KEEN began a "Detox Initiative" to remove the most toxic chemicals found in our footwear supply chain, using the six classes approach defined by the [Green Science Policy Institute](#). One of the first targets in this initiative was a proactive, voluntary approach to entirely phase out the family of toxic "forever chemicals" commonly known as PFAS.

It took us four years to phase out PFAS from our footwear manufacturing process, and we continue to work to keep them out. We learned a lot along the way, and in an effort toward radical transparency, shared our journey through our first Green Paper, "The Road to PFAS Free Footwear", published in 2020. Version 2.0 examines how the PFAS landscape has changed in three years, how industry and government policy is responding, and includes updates to our Step-By-Step Guide to PFAS Free.



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# PFAS, A CHANGING LANDSCAPE OF RETAILER REQUIREMENTS, POLICY, AND LITIGATION

## A LOT HAS HAPPENED IN THE THREE YEARS SINCE WE PUBLISHED OUR ORIGINAL GREEN PAPER: “*The Road to PFAS Free Footwear*”

1. There’s increasing public awareness of the health risks associated with PFAS chemicals. As knowledge of the potential harms of PFAS exposure grows, more people are taking steps to become educated and reduce their exposure to hazardous chemicals.
2. A growing list of outdoor companies, many adopting [bluesign-approved fabrics](#), have eliminated PFAS in their supply chain. REI, a major U.S. retailer, will require all of its brand partners to remove forever chemicals from all products, including clothing, footwear, accessories, packs and bags, and cookware, by 2026.
3. In recent years, PFAS lawsuits have been on the rise, with plaintiffs citing health issues related to PFAS exposure. As more information is known about the health risks, companies that manufacture and use these substances as part of their production process may face [increased liabilities](#) for any health issues caused by their products.
4. [State](#) legislation regulating the use and production of PFAS chemicals have significantly increased, reflecting the growing public awareness of the potential risks associated with them.

Since publishing our Green Paper, we’ve seen these emerging trends develop on corporate, private and governmental levels. In the meantime, the behind-the-scenes work at KEEN continues. We annual review and update our [Chemical Management Policy](#) and Restricted Substance List. We make constant modifications a part of our process for a few reasons, including:

- It’s an opportunity to include any recommended updates provided by [AFIRM](#), the leading authority on Restricted Substances in our industry.
- We can address any issues or concerns we’ve had in our supply chain and build short-term solutions into our long-term policies.
- We can continue on our journey to be free from the [Six Classes of Harmful Chemicals](#) by keeping an up-to-date list of banned chemicals.
- We can ensure we’re taking steps to comply with new laws and regulations.

## A NEVER-ENDING JOURNEY

In early 2022, the NRDC published a report titled “[Going out of Fashion: U.S. Apparel Manufacturers must Eliminate PFAS ‘Forever Chemicals’ from their Supply Chains](#)”. This report graded 30 of the top U.S. brands and retailers across footwear and apparel on their policies and commitments to PFAS removal. When the report card was published, KEEN had already been PFAS-free for several years, so we were surprised to receive an A- score.



While this was still the highest score for any footwear brand, it helped us see a fault with the PFAS policy we had in place. We were entirely focused on our main business, footwear, and we neglected to include bags in our policy. While this line of business is very small compared to our footwear, it was an important reminder that everything with a KEEN logo attached needs the same due diligence as our core footwear business.

KEEN has since stopped making bags, but the report pushed us to understand where else PFAS might have invaded our products we hadn't originally considered. In 2022, we took the next step in our PFAS removal journey and added a packaging category to our Chemical Management Policy & RSL. We now hold packaging suppliers to the same testing requirements as our material, component, and finished goods suppliers. This level of consideration and due diligence is continuous work necessary to keep PFAS out of our supply chain.

## LEGISLATIVE TRENDS

In recent years, there has been an increasing number of policies that ban PFAS in consumer products, with state legislatures leading the way. To date, [24 states have adopted policies](#) on PFAS, with many more bills working their way through the levels of government. Notable proposed or adopted legislation for the apparel and footwear industry as of April, 2023 include:

STATE	BILL	STATUS	DESCRIPTION
CALIFORNIA	AB 1817	ADOPTED	Beginning January 1, 2025, prohibits PFAS in clothing and textiles. PFAS in outdoor apparel for severe wet conditions will be eliminated as of 2028 and manufacturers will be required to disclose the presence of PFAS in the products as of 2025. Directs manufacturers to use the least toxic alternative.
NEW YORK	S6291A	ADOPTED	Prohibits the sale of any apparel containing perfluoroalkyl and polyfluoroalkyl substances as intentionally added chemicals.
NEW YORK	S5648	UNDER CONSIDERATION	Prohibits the sale of certain products that contain intentionally added PFAS, including textiles and textile articles (non-wearable textile goods, outdoor apparel and PPE). Requires manufacturers of products containing PFAS to provide notice of such fact to persons that offer the products for sale or distribution.
RHODE ISLAND	SB 16	UNDER CONSIDERATION	Prohibits the use of perfluoroalkyl and polyfluoroalkyl substances in carpets, upholstered furniture, textile furnishings, apparel, cosmetics juvenile products, cookware and firefighting foam and gives authority to the department of environmental management to regulate the use.
VERMONT	H.152	UNDER CONSIDERATION	Prohibits the manufacture, sale, and distribution of apparel, cookware, paper products, and pesticides containing PFAS by 2024. Prohibits the manufacture, sale, and distribution of cosmetic products containing certain chemicals and chemical classes by 2026. Prohibits the manufacture, sale, and distribution of all products containing PFAS by 2030.



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Many states are focusing their early polices on firefighting foam, food packaging, and carpets and rugs. It's expected that these types of bills will continue to gain favor across the states, and products like footwear and apparel will be affected. A full bill tracker is available at [SaferStates.com](https://www.saferstates.com).

Progress is slower on the federal level, but the EPA is acting to address PFAS. With a focus on safe drinking water, they have proposed a number of actions to address PFAS contamination in U.S. water sources, increased testing levels, and required reporting. The list of current recommendations is available at [EPA.gov](https://www.epa.gov).

## **THE PATH FORWARD**

Our goal is to create products that are not harmful to people or the planet, guided by our “Consciously Created” brand marker. We're dedicated to re-evaluating our choices and taking steps to have a positive effect.

Looking toward the future, we're utilizing new tools and technologies to gain better insight into our value chain. We'll continue to educate our fans so they can demand safer products for themselves, their families and their homes.

We'll operate with radical transparency, innovate using open-sourced solutions, and continue to be a leader in the industry. And we'll share our knowledge with anyone who wants to join us.



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# PFAS EFFECTS ON PEOPLE AND THE PLANET

## WHAT ARE PFAS?

[PFAS](#) are a class of more than 5,000 fluorinated compounds also known as per- and polyfluoroalkyl substances. They are manmade chemicals widely used to make everyday products more resistant to stains, grease, and water. They're called "forever chemicals" because they never break down. Which wouldn't be a problem in itself, but they've been found to be dangerous to environmental and human health. And they're showing up everywhere — from Everest Base Camp to breast milk.

## EFFECTS OF PFAS ON HUMAN HEALTH

There is evidence that exposure to PFAS can lead to adverse health outcomes in humans. If humans or animals ingest PFAS (by eating or drinking food or water that contains PFAS), it is absorbed and can accumulate in the body. PFAS stay in the human body for long periods of time — possibly forever. As a result, as people get exposed to PFAS from different sources over time, the level of PFAS in their bodies may contribute to adverse health effects. Studies indicate that PFAS can cause reproductive, developmental, liver, kidney, endocrine, and immunological effects.

Some examples include:

- [Increased risk of infertility](#)
- [Interference with immune system function](#)
- [Increased cardiovascular risk in women](#)
- [Increased risk of kidney cancer](#)
- [Thyroid hormone disruption](#)
- [Higher risk of Type 2 Diabetes or obesity](#)
- [Increased risk of cancer](#)

Despite the clear and growing evidence that these forever chemicals are bad for humans and the planet, businesses persist in using them. While these chemicals do provide a benefit in terms of water and stain repellency, the stakes for human and environmental health are simply too high. We know there are safe alternatives, and we want to help other manufacturers of goods break free of their dependency on PFAS.

## PFAS HAVE BEEN FOUND IN

- **Performance outdoorwear and footwear**, including waterproof and water-resistant apparel, footwear, tents, packs, and accessories made by companies in the outdoor industry.
- **Commercial household products**, including stain- and water-repellent fabrics, nonstick products (e.g., nonstick pans), polishes, waxes, paints, cleaning products, and fire-fighting foams (a major source of groundwater contamination at airports and military bases where firefighting training occurs).
- **The workplace**, including production facilities or industries (e.g., chrome plating, electronics manufacturing, or oil recovery) that use PFAS.
- **Drinking water**, typically localized and associated with a specific facility (e.g., manufacturer, landfill, wastewater treatment plant, firefighter training facility).
- **Living organisms**, including fish, animals, and humans, where PFAS have the ability to build up and persist over time.
- **Food packaged in PFAS-containing materials** (e.g., takeaway containers), processed with equipment that used PFAS, or grown in PFAS-contaminated soil or water.
- **Unintended and surprising environments**, like [high-altitude mountains](#), [Arctic sea ice](#) and [agricultural soils](#).





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# STEP-BY-STEP GUIDE TO PFAS FREE

## 1. APPLY THE PRECAUTIONARY PRINCIPLE

When we started the process to remove PFAS from our supply chain, the first step we took was to employ the Precautionary Principle, an approach increasingly used in the fields of sustainable development, environmental protection, health, trade, and food safety. The Precautionary Principle basically says, “only use what you need.”

By taking this approach, we found that PFAS were being applied to components, materials, and finished products where water repellency is simply not needed. For example, we found that the webbing on some of our water sandals were being treated with PFAS. We didn't need or want DWRs (durable water repellents) that contained PFAS used on our sandals. The application of the Precautionary Principle helped us eliminate roughly 65% of the PFAS in our supply chain and allowed us to focus on the challenge of targeting the final 35%.

## 2. CREATE A STRONG CHEMICAL MANAGEMENT POLICY AND RESTRICTED SUBSTANCES LIST (RSL)

- A.** A chemical management policy and RSL will help you better prepare for continually evolving health and environmental standards by establishing and maintaining rules and documentation on the substances contained in your supply chain and products.
- B.** Once you create or update your chemical management policy and RSL, you'll need to have the entire company, and your vendors and partners follow it and enforce it.
- C.** Encourage your vendors to use chemical formulations that meet the ZDHC [Manufacturing Restricted Substances List \(MRSL\)](#) to stop the use of banned chemicals, including so-called “long chain” PFAS in manufacturing.
- D.** Update and distribute your chemical management policy and RSL annually. Post it to your website for transparency and accountability.
- E.** Download KEEN's Chemical Management Policy and RSL in its entirety [here](#).
- F.** View [AFIRM's](#) RSL Policy, which provides an alternative chemical compounds RSL standard.

## 3. ONLY BUY RSL-TESTED MATERIALS AND COMPONENTS

It's important to only buy from suppliers that have been RSL-tested by respected third-party labs. Depending on geography, KEEN works with these leading testing labs:

- A.** [Intertek Testing Services](#)
- B.** [Bureau Veritas](#)
- C.** [SGS Testing Services](#)

Ensure that your suppliers have confirmed their understanding of, and compliance with, PFAS Free standards.



Here are some preferred suppliers that we've worked with on PFAS Free materials:

- A. [Cosmo](#)
- B. [ISA Industrial LTD](#)
- C. [Chuangyang Shoes Material Co., Ltd.](#) E-mail: [chuangyangshoes@163.com](mailto:chuangyangshoes@163.com)
- D. [CRMTO \(ChengZhang\)](#)
- E. [HengMiao](#) E-mail: [hmyo6777@163.com](mailto:hmyo6777@163.com)

#### 4. CREATE A BUDGET FOR TESTING

Testing of components (and associated costs) is the responsibility of your suppliers. You should ensure that your supplier contracts have clauses that stipulate financial penalties for non-compliance, and that you apply these penalties if and when necessary.

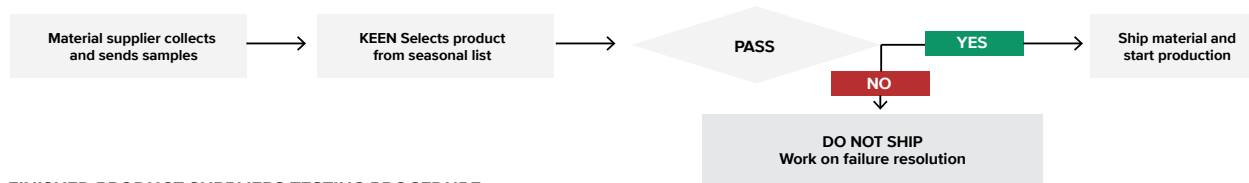
You'll also need to create a budget designated for secondary checks and testing of finished goods to verify compliance. KEEN has budgeted approximately \$75,000 per year for secondary verification testing.

You can find KEEN's Partner RSL Auditing and Scoring document in [KEEN's Chemical Management Policy and RSL](#).

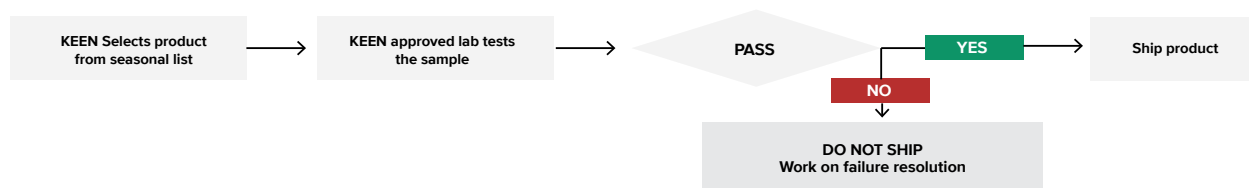
#### 5. TRUST AND VERIFY

After assembly of your finished products, have the products tested again to verify that nothing was added to your products during the assembly/manufacturing processes.

##### MATERIAL SUPPLIERS TESTING PROCEDURE



##### FINISHED PRODUCT SUPPLIERS TESTING PROCEDURE



KEEN focuses testing on our top 20% of styles that represent over 80% of our annual production volume. We also take a risk-based approach, investing more effort, energy, and cost in testing the most harmful chemicals.



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## 6. USE SAFE/EFFECTIVE/AFFORDABLE ALTERNATIVES TO PFAS

When there is a specific need for DWR (durable water repellent) applications, choose PFAS-free options that are safe, effective, and affordable.

Through lab and real-world testing, we have invested significant time and resources testing the below alternatives for their efficacy at repelling moisture and resisting stains, and their safety for humans and the environment.

- A. 3M: #3705, made from hydrocarbon resins.
- B. [Rudolph Chemie “EcoPlus”](#): made from (non-food plant based) dendritic compounds.

## 7. REMAIN VIGILANT

This is important to do as the quantity and application of PFAS continue to rise. They will inevitably enter your supply chain, even when they’re not specced. Since 2017, we’ve found PFAS on over 100 different footwear materials and components during inspection. This is a complex and challenging journey that is contrary to the current norms of supply chains and vendors. Celebrate victories and acknowledge that mistakes will be made along the way.

You’ll need to actively work with suppliers, vendors, and partners when RSL failures occur. You can find our Resolution Failure document and process in [KEEN’s Chemical Management Policy and RSL](#).

## 8. SEEK MORE KNOWLEDGE AND CONSULT WITH EXPERTS

Detoxing is a journey, and it’s beneficial to have resources and support along the way. It’s important to build a community of expert voices to ensure a consistent flow of information and points of views as the landscape is rapidly shifting. Here are two trusted resources:

**Arlene Blum:** PhD, biophysical chemist, author, and mountaineer, is a Research Associate in Chemistry at UC Berkeley and Executive Director of the Green Science Policy Institute.  
[sixclasses.org](https://sixclasses.org) / [pfascentral.org](https://pfascentral.org)

*“These forever chemicals are so broadly used and pervasive. PFAS were recently found on Mount Everest. Green Sciences Policy Institute’s mission is to facilitate safer use of chemicals to protect human and ecological health. We educate and build partnerships among government, academia, public interest groups, and businesses like KEEN to develop innovative solutions for reducing harmful chemicals in products.”*

**Chris Enlow:** Industry consultant on Corporate Sustainable Responsibility and supply chain sustainability processes. [Chris.enlow@gmail.com](mailto:Chris.enlow@gmail.com).

*“You have to view this as a journey. Don’t seek perfection, but focus on constant progress. What is the plan, data, insights, tools, and support you will need to be successful? This is a long journey, and the commitment to constant and consistent forward motion is what will allow you to be successful along the way.”*



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## JOIN US ON THIS JOURNEY

When we started this journey, we didn't think it would take four years to eliminate PFAS from our supply chain. We've estimated that we've collectively spent about 11,000 hours getting to where we are today (April, 2023). In that time, we've prevented over 180 tons of fluorinated chemicals being introduced into the environment.

We hope you'll join us in ridding our shared supply chain of PFAS, forever. We welcome your questions, comments, partnership and feedback at [detox.initiative@keenfootwear.com](mailto:detox.initiative@keenfootwear.com).

