

# THE ROAD TO PFAS FREE FOOTWEAR

## Detox The Planet Open Source Initiative

### DETOX THE PLANET INITIATIVE

In 2014, KEEN began a “detox initiative” to remove the most toxic chemicals found in our footwear supply chain. One of the first targets in this initiative was a proactive, voluntary approach to entirely phase out toxic “forever chemicals.”

It took us four years to phase out PFAS (or per- and polyfluoroalkyl substances) from our footwear manufacturing process, and we continue to work to keep them out. We learned a lot along the way, and we feel that it’s important to share our journey through this “Green Paper” — the first of many in a series. We’re also sharing partner resources so other footwear manufacturers can take immediate steps to improve their supply chain — hopefully in less time and with less financial resources.

### WHAT IS THIS DOCUMENT?

Recognizing our approach and processes are not perfect, and the negative impacts of PFAS on human and environmental health are so dire, we feel compelled to reach out beyond KEEN’s own supply chain. This Green Paper shares our processes, tools, solutions, and best practices so that anyone can join us in this initiative to eliminate PFAS from our shared supply chain.

The purpose of the Green Paper is to facilitate and contribute to a wider effort to develop more responsible business practices within footwear manufacturing and the outdoor industry. We want to do better by the planet and communities, protect those who play outside, and build products people can trust.

### 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 (Ref 1). 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.

NOTE: To eliminate any confusion, when we talk about PFAS, we’re using the abbreviation currently used by scientists, while some members of the public may be more familiar with the term PFC. The important thing to remember is that we’re talking about all toxic and “forever” chemicals that fall under this broad category.

### PFAS CAN BE 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.



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### **WHY ARE PFAS BAD NEWS FOR HUMAN HEALTH? (REF. 3)**

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 in laboratory animals. All of these effects have also been observed in human population studies. Human epidemiology studies showed findings of:

- **Reduced infant birth weights, excess maternal weight gain, and preeclampsia**
- **Damaging effects on the immune system including both immunosuppression and autoimmunity**
- **Cancer**
- **Thyroid hormone disruption**
- **Obesity and Type 2 Diabetes**
- **Reduced kidney function**

### **THE PROBLEM IS OUTDOOR FOOTWEAR BRANDS KEEP USING PFAS**

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 our peers and colleagues in the outdoor footwear industry break free of their dependency on PFAS.

### **WE'VE ELIMINATED PFAS AT KEEN, BUT THE WORLD WON'T BE PFAS FREE**

It's worth noting that while we spec our products to be PFAS Free, the extensive use of PFAS in our society — and the fact that PFAS don't degrade — makes 100% PFAS Free an elusive and constant challenge, but we have to start somewhere.

Also, while we spec our products to be PFAS Free, we believe a zone of 95% - 98% PFAS Free is a realistic standard. This is due to environmental contaminants and challenges with a class of chemicals that are already so pervasive in supply chains and in their application to dozens of components in consumer products.

## **Here is our step-by-step Green Guide to a PFAS Free process and products:**

### **1. APPLY THE [PRECAUTIONARY PRINCIPLE](#) (REF 4)**

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."



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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. ASSESS AND UNDERSTAND THE CONSEQUENCES OF PFAS

- A.** Restricted Chemicals disrupt hormones, interrupt immune systems and reproductive systems, and respiratory systems end-to-end: they're troublemakers in paradise. [PFAS are particularly heinous](#) (Ref 5).
- B.** Toxic chemicals stay in your system, accumulating and leading to potential birth defects, cancers, and other nastiness... and they're found in many everyday products.

## 3. CREATE A STRONG RESTRICTED SUBSTANCES LIST (RSL) POLICY

- A.** An 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 an RSL Policy, you'll need to have the entire company, and your vendors and partners follow it and enforce it. If you don't have an RSL policy, you can create one.
- 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. <https://mrsl.roadmapzero.com/>

Chris Enlow, industry consultant and former KEEN employee, played an important role in KEEN's RSL Policy development.

*"KEEN wanted to protect the planet by reducing their chemical footprint. They developed a plan that helped them work hand-in-hand with their entire value chain. KEEN has done a great job leading in this area, and it's critical for the future of the planet, and human health, that more brands like KEEN proactively take on this work."*

- A.** You can download KEEN's open source RSL Policy in its entirety [here](#).
- B.** Alternatively, you can also view [AFIRM's](#) RSL Policy, which provides an alternative chemical compounds RSL standard.



#### 4. 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 <https://www.cosmofabric.net>
- B. ISA Industrial LTD <https://liteleather.com/>
- C. Chuangyang Shoes Material Co.,Ltd. E-mail: [chuangyangshoes@163.com](mailto:chuangyangshoes@163.com)
- D. Crmto (ChengZhang) <https://www.crmto.com/msg/msg24.html>
- E. HengMiao E-mail: [hmyo6777@163.com](mailto:hmyo6777@163.com)

#### 5. 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 RSL Policy](#).

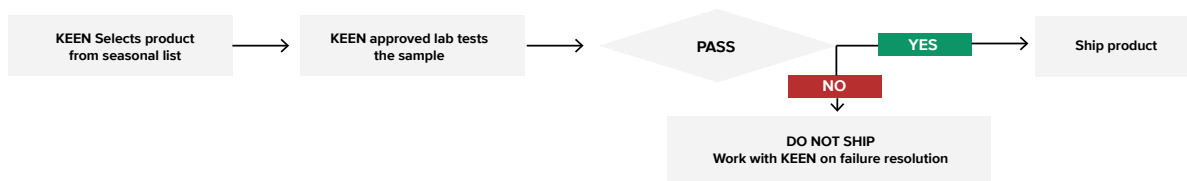
#### 6. TRUST AND VERIFY

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. (Ref 6).

TABLE 2: MATERIAL SUPPLIERS TESTING PROCEDURE



TABLE 3: 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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## 7. USE SAFE/EFFECTIVE/AFFORDABLE NON-PFAS OPTIONS

When there is a specific need for DWR (durable water repellent) applications, choose options that are safe, effective, and affordable. We have invested significant time and resources over four years, working with partners in the development and testing of safe options. Here are the best-of-the-best that we are using in KEEN products:

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

Through lab and real-world testing, we are confident that both solutions are safe for humans and the environment, as well as affordable and effective at repelling moisture and resisting stains.

## 8. 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 (unasked for) 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 RSL Policy](#).

## 9. 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 a few people that we have worked with and respect:

**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.

*“These forever chemicals are so broadly used and pervasive. PFCs were recently found on Mount Everest (Ref 7). 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). (503) 805-9962.

*“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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## 10. WORK CONSISTENTLY AND TRANSPARENTLY

Continue to annually update your RSL Policy to make sure you're testing for anything that could damage human health or the environment, and post your RSL on your website.

Check out [KEEN's RSL](#) on our website.

## 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 10,000 hours getting to where we are today. In that time, we've saved over 180 tons of fluorinated chemicals from being introduced into the environment.

Our ambition in sharing this Green Paper is to help make this journey more efficient for other businesses so they can achieve similar or greater results in a considerably shorter period of time. Every step makes an impact, and together as an industry, we can make a bigger difference.

## HOW CAN I START?

Not every company has a dedicated person or sustainability department that can take on this work of eliminating PFAS. In fact, a lot of companies don't even know what's in their supply chain. Don't let that be a deterrent. A lot of big changes start from the bottom. No matter where you work in your company, you can effect change. It can start with creating and sharing a PFAS report, setting up a task force, presenting the issue to management, or whatever makes sense for your organization. The most important thing is to take the first step. We welcome your comments and feedback at [Detox.Initiative@keenfootwear.com](mailto:Detox.Initiative@keenfootwear.com).

## SOURCES

Ref 1: [PFAS are used broadly](#)

Ref 2: [Basics on PFAS](#)

Ref 3: [PFAS are bad news for human health](#)

Ref 4: [Precautionary Principle](#)

Ref 5: [PFAS are heinous chemicals found everywhere](#)

Ref 6: Diagram - see [KEEN's RSL Policy](#)

Ref 7: [PFAS found on Mt Everest](#)

For the latest PFAS news, science, policy, and events, and a list of PFAS Free products, go to <https://pfascentral.org/>

