

Root cause investigation of PFOS contaminations in leather garments

Abstract

Perfluorooctanesulfonate (PFOS) and a number of related perfluorinated compounds are used in numerous industrial and consumer products. For leather products PFOS and other perfluorinated chemicals can be used for water repellent finishes. In March 2013 Greenpeace informed the company G-Star about amounts of PFOS in a leather jacket and gloves of its collection. The company was seriously concerned about these PFOS results and action was taken to stop worldwide distribution of the articles. Help was gathered from the Dutch and German authorities and support from the Association of the manufacturers of chemicals was asked to handle these issues adequately. After that a thorough root cause investigation was started.

Substituted substance(s)

1. Perfluorooctane sulfonic acid (PFOS)

CAS No. 1763-23-1 EC No. 217-179-8 Index No. 607-624-00-8

Chemical group Sulphonic acid derivatives

Classification

The substance has no harmonised classification according to Annex VI of Regulation (EC) No 1272/2008 (CLP Regulation)

[» Search ECHA's Classification and Labelling Inventory](#)

Other type of alternative

Application

Sector

Manufacture of textiles, wearing apparel, leather and related products

Process

Conditioning

Dyeing

Finishing (metal, wood, ceramics, textiles etc.)

Enterprise using the alternative

State of Implementation Pilot study

Date when alternative was implemented and in what country

Availability of alternative(s)

Producer or supplier

See contact information supplier



Reliability of information

Evidence of implementation: there is evidence that the solution was implemented and in use at time of publication

Hazard assessment

Perfluorooctane sulfonic acid (PFOS) is toxic to environment and reproduction and suspected of causing cancer. PFOS is listed in the Substance Database according to SUBSPORT Screening Criteria (SDSC).

» [Check the Substance Database according to SUBSPORT Screening Criteria \(SDSC\)](#)

Substitution description

In order to ensure that the leather collection does not contain any PFOS a thorough root cause investigation has been initiated. In conjunction with its leather supplier the company has worked out a step by step approach looking into details of each step of the manufacturing processes. In parallel an extensive PFOS testing program was initiated on all leather items in stock. The company did face the problem that PFOS was also detected in items from stock and took immediate and appropriate action to not market these products and find the root cause.

PFOS has a potential for long range environmental transport and is classified as persistent organic pollutant (POPs) under the Stockholm Convention, with significant health risks to wildlife and people. PFOS is the main ingredient in many stain repellent finishes. Also used as: binder in non-woven fabrics to enhance dyeing; wetting agents to improve coverage and penetration of substances; achieve finish-on-yarn uniformity; water resistance; oil resistant coatings on textiles, leather, and other.

During four months an intensive root cause investigation has been undertaken at the facility of the leather supplier. All process steps were mapped out clearly. A lot of information was provided on chemicals used, chemical suppliers and Safety Data Sheets. In terms of chemicals used, no issues were detected. Chemical suppliers are well known and a possible contamination/unintended use can be neglected. Also the supplier confirmed that no water/oil repellency chemicals are used. Testing was also conducted on fresh water (ground water) and water after reverse osmosis treatment, no PFOS was detected. To be able to investigate further, an on-site audit was performed by Sustainable Textile Solutions at the facility in India, Sustainable Textile Solutions is a program that enables brands and retailers to monitor and improve the capability of their supply chain and achieve compliance to their environmental, health and safety standards. The outcome of the review on the chemicals used, did confirm the assumption, no issues were detected. Further possible PFOS sources were identified, so as wooden pallets on which leather hides are transported. As pallets are treated with insecticides, contamination problems of PFOS could possibly result from there. Immediate action was taken to replace wooden pallets by heat treated ones. Teflon coated ironing boards, waxing material, patting boards (coated paper), cutting boards and seam sewing aids were all tested on PFOS, however nothing was detected. The company was not able to identify the tannery nor the garment factory as the possible root cause of the PFOS contamination faced.



Due to this fact, special attention has been given to the hide/wet blue. Wet blue production involves removing unwanted substances (salt, flesh, hair, and grease) from a rawhide (by soaking in a bath of lime and sodium sulfide to dissolve hair and flesh), trimming it, treating it to impart the desired grain and stretch, and finally soaking it in a chrome bath to prevent decomposition).

The supplier usually tests wet blue before production; however it is not a common practice to test wet blue on PFOS. A new testing procedure has been implemented to check wet blue on PFOS. In conjunction with the supplier the company agreed on an intense wet blue testing for the coming leather production. Based on hides/animal, countries and quantities a test based on the acceptable quality limit (AQL) calculation has been carried out. The AQL is the worst tolerable process average (mean) in percentage or ratio that is still considered acceptable; that is, it is at an acceptable quality level. Therefore a large number of PFOS tests were conducted in order to detect PFOS at wet blue stage and eliminate certain batches prior to the production process/tanning. At this point in time more than 100 tests on wet blue have been carried out. By this additional step prior to production it is possible to ensure that there will be no garments placed on the market containing PFOS.

The company believes that the failure results from contaminated water used in the wet blue tannery. A PFOS concentration of 5ppb – 6ppb in contaminant water can possibly result in the trace levels of 1.1ppb -2.0ppb which were detected in its collection of leather products from stock.

With this root cause outcome it should be possible to detect potential high risk wet blue suppliers based on country/animal if assumption can be proven. Further investigation by the company will be conducted.

Case/substitution evaluation

This case story is a report about a root cause investigation of PFOS contaminations found in leather garments provided by G-Star. It shows that the root cause of this contamination problem is resulting from the wet blue. Also in the wet blue stage PFOS is not used intentionally, but it is a contamination problem. Wet blue is traded globally by leather tanneries, a part of the supply chain which is generally difficult to influence. This case story, however, presents a way to deal with this challenge and to produce leather garments free of PFOS-contaminations.

Other solutions

Further information

Further languages available

Who provided the information

Type of information supplier

Producer / distributor

Contact

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