



Benetton Group srl

Phthalates Investigation Report

December 2022

Table of Contents

Introduction, scope and purpose 2

Foreword, Concept and Background..... 2

 What are Phthalates? 2

 Benetton’s position 2

 Legislation..... 3

Progress and Achievements 4

 What Benetton Group is doing..... 4

 The investigation 4

Next steps 6

Additional Background Information 7

 Laboratories..... 7

 Test Methods..... 7

 Detection Limits..... 7

 List of Phthalates compounds 7

Introduction, scope and purpose

Benetton had in place a monitoring and a restricted substances list on the use of Phthalates prior to signing Greenpeace's DETOX Commitment, however as part of its zero discharges pledge, Benetton Group is committed to completely eliminate Phthalates from all its products and processes.

The scope and purpose have been declared in the [Benetton Group's Detox Commitment to zero discharges](#)¹. Since January 2013, Benetton strengthened the challenge of Phthalates total elimination, recognizing the importance of a determined action in enlarging this matter and making wider the investigation into the level of compliance with [Benetton Group's RSL](#)². This has led to more stringent contracts with suppliers that call a progressive reduction of Phthalates while aiming for their complete elimination. Moreover, in June 2013, Benetton has joined the [Zero Discharge of Hazardous Chemicals \(ZDHC\) Programme](#)³, to cooperate with other leading brands and retailers committed to the 2020 target of eliminating hazardous chemicals from the textile industry.

Result are ensured by a rigorous system of controls focused on finished product testing process and that checks for possible traces in the supply-chain, as well as through a request addressed to the suppliers that have to guarantee Phthalates are not present in their chemical inventories.

Foreword, Concept and Background

What are Phthalates?

Phthalates are a group of synthetic chemicals widely used in a variety of consumer products, such as medical devices, food wrap, building materials, packaging, automotive parts, children's toys, childcare articles.

They are mainly used as plasticizers (i.e., substances added to plastics to increase their flexibility, transparency, durability, and longevity) or to soften polyvinyl chloride (PVC).

Concerning the apparel sector, they may be present in paints, printing inks, coatings, raincoats, boots, handbags and soft plastic shoes such as flip-flops or shoelace aglets (tubes).

The most common phthalates are: di-(2-ethylhexyl) phthalate (DEHP), diisononyl phthalate (DINP), dibutyl phthalate (DBP), diisodecyl phthalate (DIDP), di-n-octyl phthalate (DnOP), and benzyl butyl phthalate (BBP). Over time, these substances leach out of products and diffuse into air, water, food, house dust, soil, living organisms etcetera and for this their use is banned.

Benetton's position

Since the 1980s, period in which color and graphic screen printing in more mass produced quantities became popular, Benetton gave its preference to the "soft hand feel" that stylistically was matching with the look and the expected appearance proposed by the brand. This is not a detail because today decisions and choices are still hardly conditioned from that mindset.

Together with the plastisol inks, water based inks are the most popular in the screen printing industry.

Benetton always preferred the water based inks because they have what is called a "soft hand" once printed on material: this means that the ink cannot be easily felt when touched by hand over the design and it also provides to the garments the sensation to be more comfortable.

¹ https://www.benettongroup.com/site/assets/files/1069/benetton_group_detox_commitment.pdf

² <https://www.benettongroup.com/en/sustainability/detox/rsl/>

³ <http://www.roadmaptozero.com/>

Moreover, having Benetton almost all the printed garments on a natural material, such as cotton, water based inks react and adhere much better to it than to a material like polyester. Water based inks try to change the cotton fibers to a new color by the absorbency; they also give to water based prints a more washed out look which is ideal for vintage or faded designs. Water based inks have gained momentum in the fabric printing industry, due not only to their soft hand feel, but also for their environmental safety and for the possibility to develop new techniques and effects in printing.

Of course, compared with the Plastisol, water based inks are more difficult to cure and they require a longer drying time, adding to some other reasons, also a rationale on the production costs since plastisol takes less time to go from design to finished products. Thanks to the experience gained during decades, Benetton has been able to convey and improve the water based printing technique, training also those suppliers that were addressing to the plastisol, either for their location in countries with particular weather condition (high temperature) or for a simply question of “ease of use”.

Benetton firmly believes that there are many benefits deriving from water-based inks, because they avoid the harmful effects associated to the plastisol inks.

When it is not possible to use water based printing, Benetton grants the use of completely PVC and Phthalates free inks complying with the most stringent ecological standards in the textile industry as well as the Benetton’s RSL. This ensures the maximum security and sustainability both to environment and to products.

Legislation

Legislation under REACH (*Registration, Evaluation, Authorization and Restriction of Chemicals*)⁴ EC-Regulation No.1907/2006 restricts the use of some Phthalates compounds.

With regard to the US, some phthalates are restricted by the CPSIA (Consumer Product Safety Improvement Act) of 2008 for Apparel, Section 108.

Benetton Groups has banned the use of Phthalates in manufacturing processes and in all its products.

WATER BASED INKS



⁴ <https://echa.europa.eu/regulations/reach/legislation>

Progress and Achievements

What Benetton Group is doing

The interest of Benetton in eliminating hazardous chemicals from its products was high even before it committed to Detox. In fact, Benetton required its suppliers to accept an agreement in which the respect of safety on chemicals was an essential part.

With reference to the Phthalates, since 2010 Benetton began focusing and testing its products to verify the compliance with REACH and Oeko Tex® 100. A consistent screening methodology on products became a “must”, defined by a calculation tool based on recognized statistical methods and on suppliers’ basis. Tests are continuously conducted on raw materials and finished goods.

With the setting and the publishing of the RSL (January 2013), Benetton definitively banned and phased out the Phthalates family. The number of investigated Phthalates is growing year by year: with the annual review of the RSL, the black-listed phthalates increased from 7 in the 2010 (early stage), to 15 in the 2013 (date in which Benetton signed the Detox Commitment), to the current 27 (including the isomers) present in the latest version of the RSL published in September 2017. In this year, in fact, Benetton Group made further and important steps towards the total elimination of Phthalates, deciding on voluntary basis to tighten its requirements halving the limit values of Phthalates (as sum) from 1000 mg/Kg to the actual 500 mg/Kg and including three additional compounds, such as the Di-n-propylphthalate, Di-iso-octylphthalate and Di-n-nonylphthalate.

The investigation

As mentioned, in the years 2010 to 2012, Benetton monitored the Phthalates content in its products to comply with regulatory bindings. The number of tested compounds (Figure 1) has considerably stepped up in the 2013 with the commitment signed by Benetton, reaching its apex in the 2014 and decreasing in the following three years. The reduction of testing activities is not due to the lack of interest but it is joined to sales situation and it closely depends on the number of produced styles. According to the increase of the number of phthalates listed in the RSL released at the end of 2017, testing activities is growing again in the next three years. The decrease showed after 2020 is strictly connected to the Covid-19 pandemic and the reduction of produced styles.

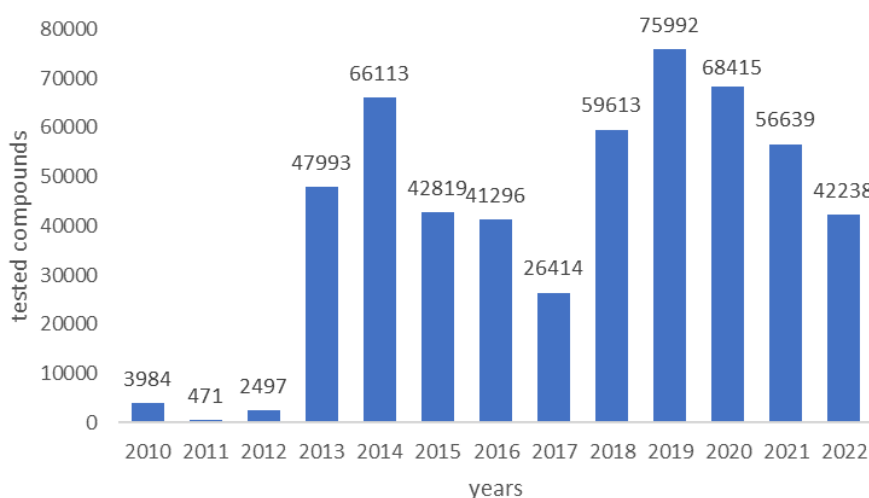


Figure 1 Number of tests performed during the years, starting from 2010.

Phthalates Investigation Report

The investigation focused on tested Phthalates shows that Benetton almost reached the total compliance. When Benetton started to verify Phthalates' presence in its products, it was already complying with a considerable value over the 96%, then it goes up and down and levelled off becoming well established over recent years with a compliance of 99.8% (as an average of the last 4 years). Some small traces still exist but, also in this case, the value of the findings is getting thinner, and it encourages to further expected progress. The following graph (Figure 2) shows the percentage of detected compounds versus the total number of tested compounds during the years.

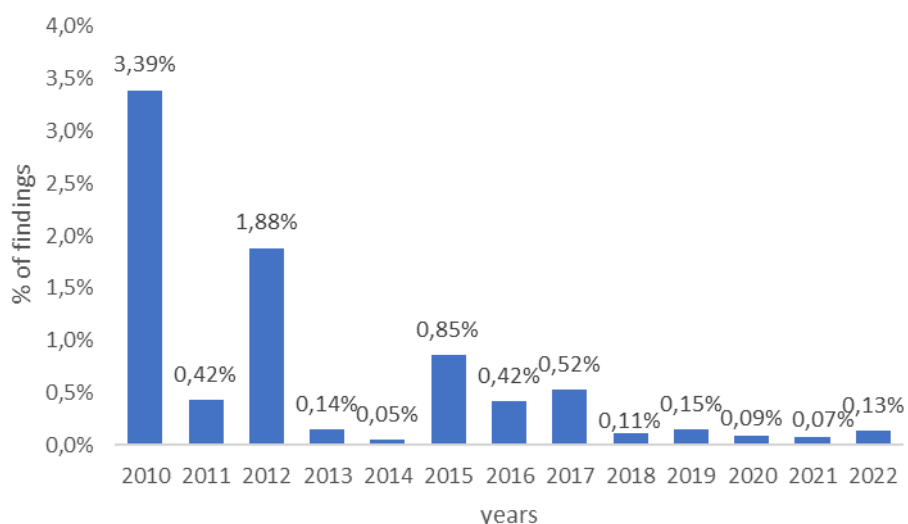


Figure 2 Percentage of detected compounds.

In figure 3, instead, is reported the average detected value of Phthalates compounds from 2010 to 2022.

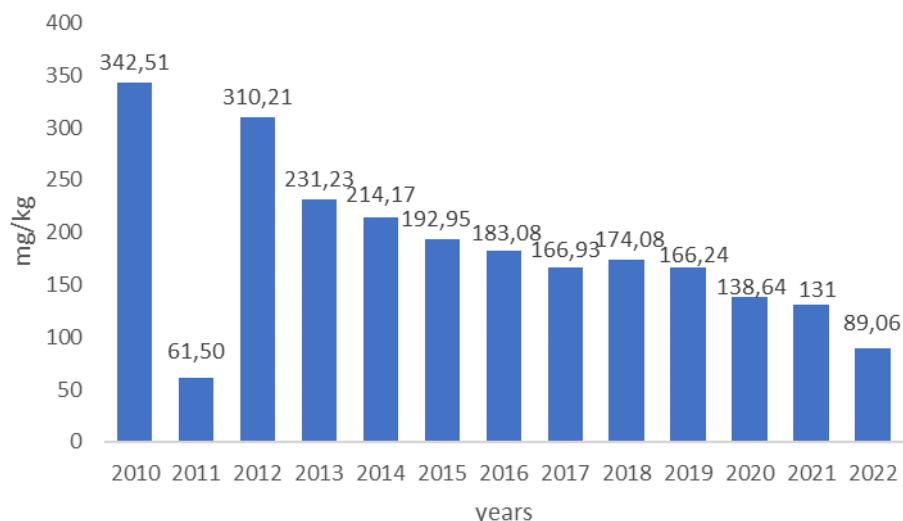


Figure 3 Average value of detected compounds during the years.

Next steps ...

Benetton will continue to monitor and limit Phthalates in the supply chain processes and in its products, aiming to achieve the total elimination of these substances.

In spite to the practical action taken and to the excellent results, we have gained to comply in the screen printing compliance, some residual problems still need to be solved in product categories such as footwear and accessories, in which the use of coated materials is more frequent.

Although these categories do not represent the core business of the company and do not pertain to the heritage of skills (since they represent a marginal part of the volumes), Benetton believes that a deepen investigation is necessary. Verification activities with suppliers to identify the causes of contamination as well as an intensive test program on materials and products are already in place.

Benetton will also continue in the screening of supplier's chemical inventory to verify the full compliance with its RSL. Moreover, as for the RSL, a guideline on *"How to use the RSL to implement a chemical substances management system"*, will be divulged in local languages, with the aim to lead a right and proper RSL use. Specific communication and "best practices" suggestions have been addressed to those suppliers having difficult state.

Phthalates Investigation Report

Additional Background Information

Laboratories

All samples were tested in globally recognized ISO 17025 testing laboratories.

Test Methods

Raw materials and products

- CPSC-CH-C1001-09.4: Standard Operating Procedure for Determination of Phthalates
- EN ISO 14389: Textiles – Determination of phthalate content – Tetrahydrofuran method

Wastewater

- US EPA 8270D, ISO 18856
- Dichloromethane extraction GC/MS

Detection Limits*

- Raw Materials and Products: 50 mg/kg (ppm)
- Wastewater: 10 µg/L (ppb)

*best reproducible detection limits currently achievable by all testing laboratories

List of Phthalates compounds

| Name | CAS-Nr. | Abbreviation |
|--|---|--------------|
| Bis(2-ethylhexyl)phthalate | 117-81-7 | DEHP |
| Dibutylphthalate | 84-74-2 | DBP |
| Di-iso-butylphthalate | 84-69-5 | DIBP |
| Benzylbutylphthalate | 85-68-7 | BBP |
| Di-n-octylphthalate | 117-84-0 | DNOP |
| Di-iso-nonylphthalate | 28553-12-0; 68515-48-0 | DINP |
| Di-iso-decylphthalate | 26761-40-0; 68515-49-1 | DIDP |
| Dimethylphthalate | 131-11-3 | DMP |
| Diethylphthalate | 84-66-2 | DEP |
| Di-n-propylphthalate | 131-16-8 | DPrP |
| Dipentylphthalate, branched and linear | 131-18-0; 605-50-5; 776297-69-9; 84777-06-0 | DPP |
| Dihexylphthalate, branched and linear | 68515-50-4; 84-75-3; 71850-09-4 | DHxP |
| Dicyclohexylphthalate | 84-61-7 | DCHP |
| Di-iso-octylphthalate | 27554-26-3 | DIOP |
| Di-n-nonylphthalate | 84-76-4 | DNP |
| Bis(2-methoxyethyl) phthalate | 117-82-8 | DMEP |
| Di-C6-8-branched alkylphthalates, C7-rich | 71888-89-6 | DIHP |
| Di-C7-11-branched and linear alkylphthalates | 68515-42-4 | DHNUP |
| Di-C6-10 alkylphthalates | 68515-51-5 | |
| Di-decyl/hexyl/octyl (mixed) phthalates | 68648-93-1 | |