



**ORIGINAL**  
SINCE 2001

# Polyethylene vs. PVC

## HOME box

Lately, we have had an increasing number of customers and retailers approaching us with questions and concerns about some problems they have heard of with grow boxes. Some were simple problems like the cover material becoming brittle with use or a strange smell to the boxes when they are new (due to outgasing); other problems ranged from weird, complex to some that were a bit frightening like plants yellowing and dying within the grow boxes. Everybody wanted to know if these things could happen with an Original Homebox as well. The answer is "No."

How can we be so sure? Let me explain.

Our Homeboxes were on the market for over 3 years before the first imitations appeared. In that time we have not received one single complaint. And, we can assure everyone, that all these problems will definitely not occur with any of our products which are of the highest quality.

### Only the Original Homebox is constructed without PVC.

#### We use only PE!

When starting the inventing process of the portable grow box we named Homebox, finding the perfect material needed for the cover was a huge issue for us. The demands were set fast:

- Durable and tough but not too heavy,
- Lightproof
- Reflecting inside

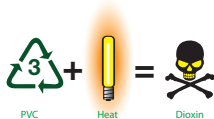


Soon it was clear, that it had to be several materials, combined to one. Looking only at these perimeters, Polyvinyl chloride (PVC) seemed to be the best solution, followed by Polyurethane (PU), which has very similar properties. It is easy to laminate, tough and relatively cheap. But we also had clear demands concerning the protection of:

- The users and consumers health
- The environment

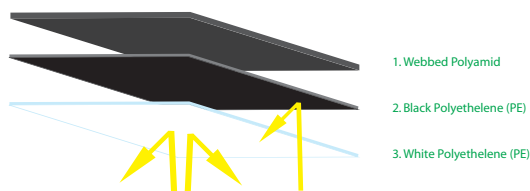
Now, looking at these factors, both PVC and PU were instantly not a choice any more.

We researched a lot, and after long time and many investments into trials and tests, we found the perfect combination for our Material.



It consists of **3 layers** :

- on the outside we use webbed Polyamid (PA), for strength and durability and to make sowing possible
- as a middle layer, we use black Polyethylene (PE) to guarantee that it is lightproof
- the inner layer is white PE to ensure maximum reflection and perfect ability to clean



Why did we choose to use PA and PE instead of PVC or PU? And why is that so important in reference to the occurring problems?

To explain that, let us peek a bit into material science. What are the different characteristics of PVC, PU, PA and PE?

#### PVC:

Polyvinyl chloride is a thermoplastic polymer. Polyvinyl chloride (PVC) is unique in its high chlorine and additives (softeners) content, which makes it an environmental poison throughout its life cycle. Vinyl chloride is a known human carcinogen (BUA 1986, 1987, 1993; Gray et al. 2000, Foster 2000, Ema et al. 2001, Kavlock et al. 2002a, 2002b, 2002c). PVC releases dioxin and other persistent organic pollutants during its manufacture and disposal and cannot be readily recycled due to its chlorine and additive content.

Workers in PVC production were getting sick (lung and joint problems). This was soon known as the so called VC-disease.

Furthermore, additives are not bound to the plastic and leach out. To make PVC soft, a lot of softeners have to be added. One of the most commonly used softeners is di-ethylhexyl phthalate (DEHP). Flexible PVC products typically contain 30 to 40 percent DEHP by weight, but that figure can reach 80 percent in applications where flexibility is critical. DEHP is known to be hormone disrupting, and otherwise health damaging (Ema et al. 1993, 1994, 1998; Shiota et al. 1980; Shiota und Nishimura 1982; Kavlock et al. 2002). This is especially true for children and genital organs. It was abandoned by the USA and EU last years, but only for children toys, and only in these Countries. No one knows what softeners are used in the PVC that is produced and used in products imported from China, for example.

## PU

Polyurethane (PU) is mainly used in insulation and soft/foamed products like carpet underlay. It uses several hazardous intermediates and creates numerous hazardous by-products. These include phosgene, isocyanates, toluene, diamines, and the ozone-depleting gases methylene chloride and CFCs, as well as halogenated flame retardants and pigments. The burning of PU releases numerous hazardous chemicals such as isocyanates, carbon dioxide, hydrogen cyanide, PAHs and dioxins.

## PE

Polyolefins such as Polyethylene (PE) are simpler polymer structures that do not need plasticizers, although they do use additives such as UV and heat stabilizers. The polyolefins pose fewer risks and have the highest potential for mechanical recycling. Both PE and PP are versatile, and can be designed to replace almost all PVC applications. PE can be made either hard, or very flexible, without the use of plasticizers.

In comparison with PVC, PE uses fewer problematic additives, has reduced leaching potential in landfills, reduced potential for dioxin formation during burning (PE burns completely into CO<sub>2</sub> and H<sub>2</sub>O) and reduced technical problems and costs during recycling.

## PA

Polyamids can occur both naturally, examples being proteins, such as wool and silk, and can be made artificially, one example is Nylon. They have many characteristics that make them perfect for fabric production: lightweight, elastic, stainable, mothproof, tearproof, do not decay and are resistant against leach as well as creases.

After this short excursion into material science, it should be clear why the PVC used in the mock copies

most likely is the reason for the occurring problems. We from EASTSIDE-impex invested a lot of time and money to find the right partner in China, who is able to process PE and PA into the material we use. It was not easy, but we knew we could not go for the alternative (PVC).

Our philosophy is that the best way to earn money is through happy, healthy and safe customers, not through maximised profit.

R&D department EASTSIDE-impex  
[www.homebox.net](http://www.homebox.net)

## We've got you covered

### Links and references:

<http://www.mindfully.org/Plastic/DEHP-Infants-At-Risk.htm>  
<http://www.teesvalleyjsu.gov.uk/old/dicidauk/keyissues/PVCEU/PVCEUindex2.htm>  
[http://www.wecf.eu/english/articles/2004/09/pvc\\_ban\\_extended.php](http://www.wecf.eu/english/articles/2004/09/pvc_ban_extended.php)  
[http://www.pharosproject.net/wiki/index.php?title=Asthma\\_%26\\_PVC\\_flooring](http://www.pharosproject.net/wiki/index.php?title=Asthma_%26_PVC_flooring)  
<http://archive.greenpeace.org/toxics/pvcdatabase/bad.html>  
<http://en.wikipedia.org/wiki/PVC>  
<http://en.wikipedia.org/wiki/Polyamide>

**NOTE:** we found many more good links in German, but not so many in English.

This was a bit odd for us, but that's how it is. Just for your reference, we give them as well:

**PVC:** <http://de.wikipedia.org/wiki/Polyvinylchlorid>

**PE:** <http://de.wikipedia.org/wiki/Polyethylen>

<http://www.chemie.fu-berlin.de/chemie/kunststoffe/polyethylen.htm>

**PA:** <http://de.wikipedia.org/wiki/Polyamid>

<http://www.chemie.fuberlin.de/chemie/kunststoffe/amid.htm>

Info on softeners: <http://www.umweltbundesamt.de/gesundheitsstoffe/weichmacher.htm>

### Info on DEHP:

[http://www.allum.de/index.php?mod=noxe&n\\_id=19](http://www.allum.de/index.php?mod=noxe&n_id=19)

**DFG research on PVC-Softeners:** <http://www.innovations-report.de/html/berichte/studien/bericht-27002.html>

**Further info on Phthalates:** [http://www.arbeitsmedizin.uni-erlangen.de/Koch\\_Phthalate.htm](http://www.arbeitsmedizin.uni-erlangen.de/Koch_Phthalate.htm)



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