White Paper:
The Common Fallacies of PVC

MAY 2012

WHITE PAPER

Where did the fear about using PVC start?

Fear about PVC stems from the early 1970s, when workers who had been cleaning the insides of mixing tanks in a PVC production plant contracted a rare form of liver cancer. Once the cause of the cancer was tied to their extended exposure to gases in the tank, the PVC industry became proactive and made dramatic changes in the production process to eliminate such risk. Since then, the industry has been put in a position to prove that the manufacturing, use and disposal of PVC are safe. Included is this paper are comments and research from several scientists, institutions and governmental bodies that question the safety concern of PVC; particularly, in the building product arena.

Enter the activist groups

The health scare in the 1970s made it easier for Greenpeace and other activist groups to receive grants that would fund their efforts to discontinue the use of PVC and PVC-based products.

Dr. Patrick Moore, Co-Founder of Greenpeace says the PVC issue is 'fabricated by activists':

"There is not a shred of evidence that vinyl-based products are unsafe to human health or harmful to the environment. This issue is almost entirely fabricated by activists who have latched onto PVC and chlorine as issues that allow them to apply for grants to support their efforts to destroy this important industry and material. These activists are determined and can't be swayed by logic or facts. They seem to be on a personal crusade."

Without grants, an activist group will fold; hence, people will be out of jobs. Therefore, one might conclude that some activists are motivated to exaggerate or fabricate a news item to further their personal bank accounts and keep their businesses afloat.

What about the studies that state PVC is dangerous to the environment?

There has been much written on this subject, yet the more one reads about the subject, one will find many studies and expert opinions that will conclude that there is no conclusive evidence to support that PVC is dangerous to the environment.
Here are three examples:

1. ***Why did the United States Green Building Council (USGBC) issue a LEED pilot credit to deselect the use of PVC?***

   Consider that the USGBC assembled a Technical and Scientific Advisory Committee (TSAC) that spent years researching the issue of PVC. The committee concluded in its draft report, which was released in December 2004, and in its final report released in February 2007, that "the available evidence does not support a conclusion that PVC is consistently worse than alternative materials on a life-cycle environmental and health basis" and "does not support a credit in the LEED rating system supporting

the elimination of PVC." Nevertheless, USGBC is opposing the conclusions of its own research by inserting this credit in LEED.

2. The American Council on Science and Health study

The American Council on Science and Health, which includes 17 experts from the United States, Canada and Europe, is led by Dr. C.E. Koop, former U.S. Surgeon General. The council concluded that PVC, as used in medical devices, is not harmful to humans even under chronic or higher-than-average conditions of exposure.

3. The European Commission

Additionally, the European Commission announced, in a final report released in July 2004, that its survey of ***250*** studies assessing life-cycle characteristics of vinyl and of principal competing materials, found vinyl compared favorably with other materials in terms of environmental impacts.

The fallacy Of PVC dioxin emissions

Dioxin can be produced when almost anything burns. This is because chlorine, a component of dioxin, is found in almost all organic (flammable) material.

Source: Environmental Profile: Vinyl Roofing Membranes, CFFA

Dioxin PVC resin manufacturing

The Past: Decades ago, even industry officials concluded that dioxin was an issue in the manufacturing of PVC resin. Since the 1970's tank cleaning incident, the industry has made great strides in capturing dioxin.

Today: Activists will site that there are 7.5 billion nanograms of dioxin emitted during the manufacturing of the PVC polymer every year. What they fail to inform you is that 7.5 billion nanograms is equal to 7.5 grams. To put this into perspective, one single serving of potato chips has 10 grams of fat!

Source: Environmental Protection Agency

Dioxin emissions: incineration burning

The Past: Incineration equipment, in general, did a less-than-adequate job of capturing dioxin released during the burning of PVC products. Furthermore, many building owners (e.g., hospitals) burned their own waste using even less efficient equipment.

Today: Over the years, incineration equipment has been altered to capture virtually all dioxin. In addition, many places that incinerated their own waste, now send the waste to companies that have specific equipment for incinerating PVC. Lastly, the demand for incineration is declining rapidly given the increased use of recycling.

Source: Environmental Profile: Vinyl Roofing Membranes, CFFA

Dioxin emissions total

While the growth of products containing PVC has grown rapidly since 1987, dioxin emissions decreased 90%. The Center for Disease Control (CDC) concluded that human blood levels of dioxin have decreased 80% since the 1980s. Given the 7.5 gram figure cited above, the manufacturing of vinyl is a minimal factor in dioxin generation, ranking well behind forest and brush fires, as an example.

Source: U.S. Center for Disease Control

The fallacy of chlorine

Chlorine used in PVC is derived from salt. Chlorine is used to make more than 10,000 products, many of which we all use every day; including some of the medicines we ingest. Chlorine in PVC is no more dangerous than chlorine in our medicines.

The Past: During the processing of PVC, chlorine is separated from salt brine through electrolysis. There are three electrolytic processes: the diaphragm cell, initiated in 1885, the mercury cell, 1892, and the membrane cell, 1970. Until the advent of the membrane cell technique, mercury pollution from the production of PVC was an issue.

Today: Since 1970, there has been a transition to the membrane cell technique. As a result, in 2006, mercury emissions from chlorine manufacturing accounted for less than 1% of total emissions, natural and human. For reference, volcanic eruptions and crematories are other sources of mercury emissions.

Source: Best Practice Guidelines for the Life Cycle of PVC Building Products, The Green Building Council of Australia, Jan 15, 2010

The fallacy of phthalates

Phthalates are added to make PVC flexible. Given they are not chemically attached to the PVC resin, they will migrate over time. It is important to note that all phthalates are not created equal.

In general, phthalates can be divided into four categories: high or low molecular weight branched and high or low molecular weight linear. From a migration standpoint, the low molecular weight branched versions will migrate the fastest, and the high molecular weight linear will migrate the slowest. For most building products, (e.g., roofing membranes, which need to last a long time) the higher molecular weight linear version is most commonly used.

There has been much written about human exposure to phthalates, yet for every study that concludes with human exposure issues, there is a counter study or argument that contradicts or, at least, questions the results.

Here are some examples:

Do phthalates leach out of products and accumulate in our bodies?

Phthalates do not migrate out of products easily and they do not build up in the human body. Phthalates begin to break down within minutes and are eliminated from the body within hours. Average phthalate exposure is far below levels set by U.S. federal agencies to be protective of human health.

Source: U.S. Centers for Disease Control and Prevention (CDC) studies

Why did the United States and European Union restrict the use of phthalates in toys?

The decision to restrict the use of phthalates in childrens' products is not based on science. Importantly, after phthalates were restricted in the U.S., as part of the Consumer Product Safety Improvement Act, a scientist at the U.S. Consumer product Safety Commission (CPSC) stated that she did not believe that phthalates posed a risk of injury to children.

Source: U.S. Consumer Product Safety Commission (CPSC)

Similarly, the European legislature voted to restrict phthalates, despite the draft conclusion of an exhaustive safety review of the primary phthalate used in toys stated it was unlikely to pose a risk, even to newborns.

Source: European Legislature

Isn't it true that phthalates cause health problems in laboratory animals?

Some, but not all, phthalates interfere with the development of the reproductive systems of male rodents when administered in huge doses; doses far larger than CDC data reports of humans experiencing. It's important to note that rodent effects are not relevant to humans. A number of studies indicate that humans do not absorb phthalates as readily as rodents do. Humans break phthalates down and excrete them much easier than rodents. This evidence suggests that rodent effects do not apply to humans. In fact, tests on male marmosets, which are primates, showed that even huge doses administered from weaning until sexual maturity had no effect on their reproductive organs.

Source: U.S. Center for Disease Control

If all of the studies cited by activists were conclusive evidence, (which they're not) the exposure would be much less with PVC products that use high molecular weight linear phthalates. If you're producing a roofing product that demands a 20-year plus life, it is only logical that you would use a high molecular weight linear phthalate because they migrate at the slowest rate. In addition, one must be able to make the distinction of exposure risks when comparing a child's toy and a material used to provide rooftop protection.

Summary of the fallacies of PVC

PVC became an easy target for activists to single-out given the event in the 1970s that triggered this backlash. At that time in history, the backlash for the production of PVC was warranted. We all want to live in a safe environment. Four decades later, the production of PVC isn't an issue.

Regarding the use of PVC, there are countless research studies from numerous sources, including the EPA, U.S. Center for Disease Control and Prevention, and the U.S. Consumer Product Safety Commission that counter the supposed safety claims with which activists pound the media.

For more information about the safety of PVC, PVC-based products, or FiberTite Roofing Systems please call Seaman Corporation at (800) 927-8578, or click here.

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