

RE-USE

Economy

Recycle

ENVIRONMENT

Community

REDUCE

Sustainable

Spectus: the environment and the community.

Introduction

Concern for the environment is no longer confined to small pressure groups, and is no longer considered idiosyncratic. Global warming is widely recognised as fact. Some people feel recent unusual, and sometimes catastrophic, weather events are a direct consequence of industrial activity.

Nearly all human activity has an effect on the environment. That the activities of Spectus have an effect on the environment is undeniable. On the other hand the products Spectus manufacture help reduce pollution by improving thermal efficiency. The aim must be to make the overall impact neutral or positive. There are many ways to achieve this from simple good house keeping, to the use of "carbon credits" to offset carbon emissions.

There are other factors to consider. For example the social and economic benefits generated by industrial activity. Such considerations are at the root of discussions concerning the pollution generated by rapidly developing countries such as India and China.

Sustainability - the ability to continue to do what we are doing - is also a key objective.

This publication provides an environmental overview of the materials and processes required to manufacture, use and dispose of PVC and of Spectus' PVC-U products in particular. It also considers sustainability in relation to PVC-U and the social and economic benefits that accrue. The conclusion is that, when judged by objective criteria, the overall impact of the PVC industry in the UK and globally is positive. At Spectus we are proud to be one of the key players in that industry.

PVC

There have been concerns voiced about PVC, its constituent parts and the by-products of manufacture. Concerns centre on the use of non-renewable fossil fuels, the chlorine content of PVC-U and the production of dioxins during manufacture. Further concerns have been raised about recycling, disposal and, of course, sustainability.

In fact, much of the anxiety surrounding PVC has no basis in truth - or the negative effects have been exaggerated.

PVC stands for Poly Vinyl Chloride. Spectus window profiles are made from PVC-U, which stands for Poly Vinyl Chloride Unplasticised - i.e. it contains none of the plasticiser that makes materials such as cling film flexible.

Chlorine

The non fossil fuel derived content of PVC (approximately 57%) is predominately chlorine, derived from salt (Sodium Chloride), one of the most common materials in the earth's crust. Chlorine performs many useful functions. For example, it is used to purify water supplies to prevent the spread of disease. Salt itself has an estimated 14,000 uses. It is used for road safety, in agriculture, pharmacology, and it makes chips taste great.

Reserves of salt are estimated at 10 million, billion tonnes. Obviously we are unlikely to run out any time soon.¹



Fossil fuel content

The fossil fuel content of PVC-U is approximately 43%. When oil is refined it can yield a number of useful chemicals, one of which is ethylene - the chemical used in the manufacture of PVC. Some have claimed that it takes eight tonnes of oil to make one tonne of PVC, the inference being that the remainder is wasted. Obviously this is untrue.

Fossil fuel resources are finite. Estimates as to how long they will last vary and frequently change. According to predictions made in the 60s we should have run out by now. Additional deposits keep being discovered and they are being extracted and used more efficiently.

More important perhaps is that it has been demonstrated that ethylene can be derived from renewable organic feedstocks.

Dioxins

Some have expressed concern about the dioxins that are released during the manufacture of PVC resin, minute quantities are indeed produced. However, those dioxins are almost exclusively retained within the pipe work of the manufacturing plant. They are removed under carefully controlled conditions and destroyed in special high temperature incinerators.

According to the World Health Organisation dioxins are by-products of industrial processes but can also result from natural processes, such as volcanic eruptions and forest fires. Amongst the processes cited by WHO are smelting, bleaching of paper pulp and the manufacturing of some herbicides and pesticides – no mention of PVC. The WHO goes on to say that in terms of dioxin release into the environment, solid waste incinerators are the worst culprits due to incomplete combustion.

A inventory of dioxin sources in the UK, by DEFRA indicated that in 1999, the dominant dioxin emissions sources were metal processing and accidental fires. Indeed, studies also suggest that as much as 14% of the total UK annual emissions can be attributed to 'Bonfire Night'. 'A Review of Dioxin Emission in the UK', published by Her Majesty's Inspectorate of Pollution (HMIP) in September 1995 concurs. According to that report, more dioxins are released to the atmosphere through sources involving the combustion of wood than are produced by the entire halogenated chemicals industry.

In fact that industry is strictly regulated - the highest concentration of dioxins allowed for industrial discharges is 0.1ng/cubic metre of emission. A report carried out in France in 2003 discovered that dioxin concentration in the vicinity of a standard BBQ has been measured at 0.7ng/cubic metre, seven times the industrial concentration limit.²

The conclusion must be that stopping PVC production would have a negligible effect on dioxin levels.

Hydro Polymers a major manufacturer of PVC resin carefully monitors their dioxin emissions. They are typically 40-110mg TEQ per year (milligrams per year measured). The engine on a tug boat emits around 70mg TEQ per year.³



Disposal

The need to dispose of PVC, especially PVC-U window profiles will become less and less common as initiatives that increase recycling take effect.

If PVC does find its way into landfill sites it actually contributes to their stability. It does not contribute to the formation of methane or other gases, nor to the formation or creation of leachates. PVC can be safely incinerated in modern incinerators.

Recycle

PVC is a thermoplastic. That means that it can be repeatedly melted and reformed. As a result it can be easily and cost effectively recycled.

Recycling manufacturing waste.

Process waste from PVC-U window extrusion and fabrication has been re-included into products for as long as the process has existed. Almost 100% of the mass of the raw material PVC-U ends up as useful product.

Recycling post consumer waste.

For many years recycling post consumer waste has not been an issue for the PVC-U window industry – basically because such is the durability of the material, there have not been significant quantities of post consumer waste.

However, for the last four years the PVC-U industry has been working towards recovering post consumer waste (from demolition and refurbishment projects) and feeding it back into the production process. An organisation called RecoVinyl is now having significant success, recovering over nine thousand tonnes of post consumer material in 2006. A WRAP funded BRE study into methods of recycling post consumer windows, demonstrated the feasibility and recommended methods of separating and recycling PVC-U windows.⁴ It is estimated that PVC-U can be recycled four times without significant degradation. This means the material has a life span of well over 140 years, assuming a product life span of 35 years, which has been confirmed by a recent BRE study.⁵

Spectus has participated in social housing refurbishment projects in the UK where there has been a requirement for the old PVC-U windows to be broken down into their component parts (PVC, glass, gasket, hardware). Each of those materials was then required to be recycled into products for use in the community.

Sustainability

A material's sustainability needs to be assessed not just in terms of the environmental but in terms of the social and economic benefits as well.

Environmental sustainability

The 'EU' definition of sustainability is "by doing what we're doing now, we don't damage our future ability to do the same". Perhaps more simply put, can we continue to manufacture PVC indefinitely?

The short answer is yes, or for at least for as long as the sea is salty, crops grow and PVC remains a thermo-plastic that can be recycled.

As we have seen the earth's salt stocks are immense – it is unimaginable that they would ever be depleted.

A proportion of PVC-U is currently derived from fossil fuels, but the ethylene required for PVC-U production could easily come from ethanol, which can be produced from organic material. A company called San Mar, based in India has produced PVC from the fermentation of sugar and has already produced ethylene from vegetable oil and cost effectiveness will improve as the technology progresses.

Perhaps more importantly an old PVC window can be turned into a new PVC-U window. As a global community the goal must be the cyclical use of resources, as illustrated, the key to which is recycling. A linear use of resources that excludes recycling can indicate un-sustainability.

Social and economic sustainability

The PVC-U industry makes a substantial contribution to social and economic success of the UK. It provides employment and a living for thousands of people. It turns over in excess of £17.5 billion and represents 2.1% of the UK's GDP. The PVC-U window industry alone is worth around £4 billion per annum.

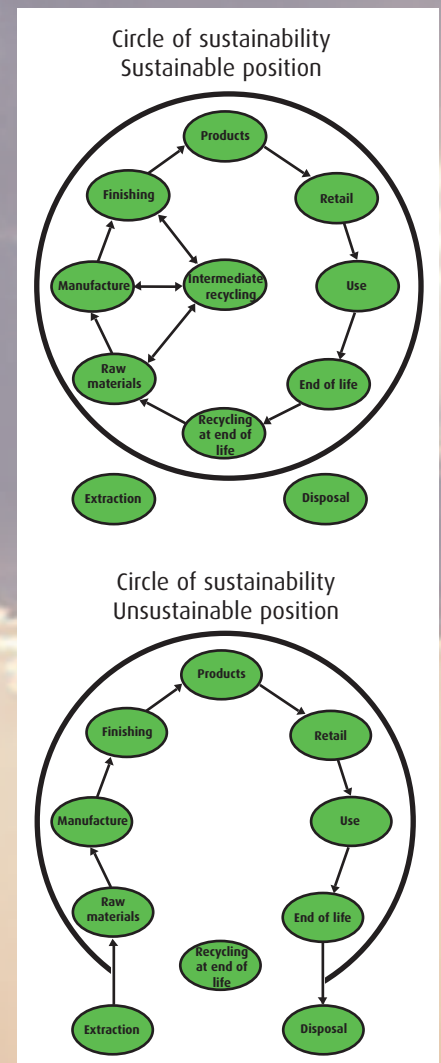
Spectus is a team of people working together to create a better life for themselves and their families. That team is part of a wider community that inhabits the area where the factory is located and the work force live.

The company brings many benefits to that community. Wages quickly move beyond immediate employees providing custom for other local businesses. In return Spectus benefits from a settled, motivated and flexible workforce and everybody enjoys the improvements to infrastructure and other facilities that result from a vibrant local economy. Spectus sells its products to fabricators around the UK and overseas and their success in turn enriches their local communities.

PVC a natural product

The chemistry is complicated but in a nutshell organohalogens occur in nature.

Organohalogens, are the group of compounds that contain a halogen atom (fluorine, chlorine, bromine, or iodine) bonded to a carbon atom. Vinyl Chloride – an organohalogen and the monomer used in the manufacture of PVC – is a natural soil product. Natural organohalogens continue to be discovered at the rate of 100-200 a year. Currently there are more than 4,000 known of which 2,400 are organochlorides.



The Carbon Neutral Window

“Carbon offsets” can be purchased by individuals, businesses and governments from a variety of commercial and non-commercial organisations. For example, the UK government purchased offsets for the air travel required for the 31st G8 summit. The purpose is to offset the carbon emissions by investing in projects that absorb or reduce carbon dioxide emissions.

Offset activities can vary widely; the most frequent are planting trees, followed by various energy conservation activities.

It has been calculated that the cost of offsetting the carbon emissions generated by the extrusion, fabrication, transportation and installation of a PVC-U window would be equivalent to only 0.5% of the installed cost.

Spectus is good for the environment?

- PVC-U windows and doors reduce heat loss and therefore the building requires less heating and so emissions are reduced.
- Windows and doors made from PVC reduce the need to chop down trees
- PVC is recyclable and so need not be incinerated, thus reducing emissions
- PVC-U windows do not need painting and therefore don't consume materials or generate associated waste
- The entire process – from PVC production to window installation - takes place within the UK thereby minimising transportation and fuel consumption and reducing carbon dioxide emissions.

Don't take our word for it...

“There is absolutely no evidence that vinyl damages human health or the environment. PVC is durable, low maintenance recyclable and performs well in LCA tests” – Dr Patrick Moore, founding member of Greenpeace (2006)

“We should learn to live with this rather wonderful plastic” Dr John Emsley, University of Cambridge,

“...concerning PVC and the chlorine based industry in general, Ministers have made it clear that independent evidence, such as that from Professor Rappe, the Independent Scientific Advisor to the EU and the World Health Organisation, demonstrates that PVC is a safe material in use and emissions from its manufacture and disposal are controlled by the Environment Agency.” – John Battle MP, Minister of State for Science Energy and Industry in the UK Government, as stated in a letter to the BPF from the Minister (October 1997).



GLOSSARY

- 1- Norsk Hydro PVC & Environment White book
- 2- Robin des Bois, France 2003
- 3- www.hydro.com/en/global_commitment/environment/other_impacts/polymers/index.html
- 4- How to recycle your window waste – WRAP
- 5- BRE Green Guide.

ISO 14000

After the success of the ISO9000 series of quality standards, the International Standards Organisation published a comprehensive set of standards for environmental management. This series of standards is designed to cover the whole area of environmental issues for organisations in the global marketplace. The aim is to:

- Promote a common approach to environmental management similar to quality management
- Enhance organisations' ability to attain and measure improvements in environmental performance
- Facilitate trade and remove trade barriers.

The standard provides guidance on:

- environmental management systems
- environmental auditing
- environmental performance evaluation
- environmental labelling
- life-cycle assessment
- environmental aspects in product standards

Spectus is fully committed to ISO 14000, which covers the full spread of environmental issues including, waste water, noise, fuel use, refuse, disposal and recycling.

