OVERVIEW · NOTE 2 ·

RECYCLING PVC

step towards *sustainability*

Science Supporting PVC in the Environment

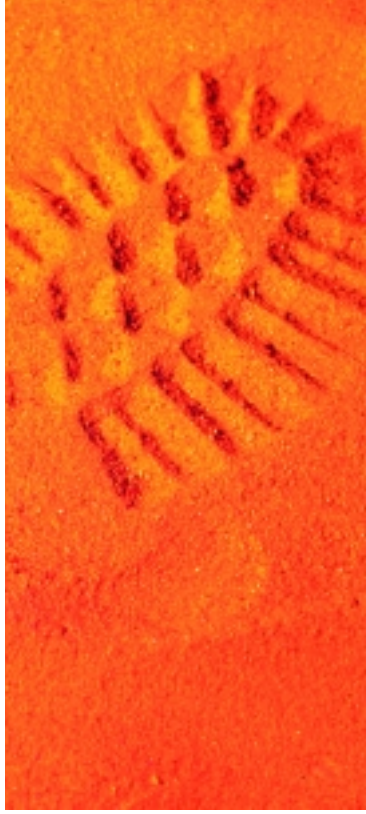
In years to come, your trusty PVC footwear might have had a former life as telephone cable. Who knows what new ideas will come out of the ever-increasing opportunities for recycling? Most of us are familiar with the well-established routes for recycling metal and glass, but few of us appreciate the major advances now being achieved in plastics recycling. Already, used PVC products are being turned into garden seats and farm fencing. This Overview Note aims to give the facts, the science and the reasoning behind why we believe PVC is entirely safe in recovery and disposal.

> "The presence of the chlorine molecule means PVC can easily be identified and separated from other plastics for recycling."

Recycling PVC

The recycling of PVC is a relatively straightforward process. PVC is tolerant of many contaminants and the presence of the chlorine molecule is an aid to PVC being identified and separated from other plastics for recycling. There are many recycling schemes now in operation around Europe. For example, pipes are recycled in Sweden and the Netherlands, window profiles and flooring in Germany and Austria, bottles in France, Italy, and Belgium, and cable insulation in the United Kingdom.

PVC
Good for Life...
Good for the Environment



There is a growing range of applications for the recyclate produced – here are just a few examples – PVC bottles are turned into into pipe, ducting and textiles; PVC flooring into flooring again; PVC cable insulation into floor mats and automotive mudflaps and PVC windows into window profiles and ducting.

As with other plastics, the potential for collecting and recycling PVC products is enhanced when the material is easy to identify, separate and keep clean. This enables an appropriate quality of recyclate to be produced.

Examples are:

End of life product	New outlet
Bottles	Pipes Profiles Fittings Clothing Shoe soles
Flooring	Flooring
Pipes	Pipes
Roof covering membranes	Water proofing liners
Window profiles	Window profiles

Recyclate from PVC applications which contains another material, but cannot be separated into pure PVC is only suitable for such applications where the mixed composition can be tolerated. PVC recycling operations covering such products have also been initiated.

These include:

End of life product	New outlet
Cable	Industrial flooring General purpose compounds
Leather cloth	Moulded mats Carpet backings

Some of the listed recycling operations have already reached an industrial level whilst others are still in a development phase.

Feedstock recycling

Feedstock recycling is important for two reasons – to have technologies in place which are less sensitive than mechanical recycling to unsorted or contaminated waste products and, secondly, to enlarge the overall recycling capacities for the larger waste quantities of the future.

There are a number of composites or multiple material products which cannot be economically or technically sorted into generic (single) polymer streams. Examples are laminated films, leather cloth, footwear and car dashboards. Most feedstock recycling processes today focus on mixed plastics waste from packaging sources

Other Recovery Routes

- Incineration

If PVC is disposed of by incineration, preferably with energy recovery or as part of a combined heat and power system, it has a similar heat value to wood or paper but produces less CO_2 per kg of material than the combustion of other materials such as wood or coal.

Although PVC represents only about 0.7% of the waste stream, concerns continue to be raised about what happens to the chlorine in PVC upon combustion in managed incinerators. However, many everyday substances contained in municipal solid waste

can give off hydrochloric acid (HC) during combustion.

Many studies have now concluded that the presence or absence of PVC in the waste stream has no effect on the level of dioxin emissions, again because of the presence of so many other chlorine-containing substances.

A comprehensive study by the American Society of Mechanical Engineers ('The relationship between chlorine in waste streams and dioxin emissions from waste combustor stacks') in 1995 found no correlation between the presence of PVC wastes and dioxin emissions in more than 1,900 incineration tests conducted at solid and hazardous waste facilities around the world.

- Landfill

The disposal of used PVC products in landfill is considered by the PVC industry to be a valid component of integrated waste management. Such disposal has always been considered as safe and recently confirmed by the Swedish Environmental Protection Agency. Although there could be a minimal migration of plasticisers out of a minority of certain PVC products in landfill, the Swedish study confirmed these as readily biodegradable.

To verify the environmental impact of PVC in landfills, a three-year research project on the long-term behaviour of PVC products in landfill carried out by the universities of Gothenburg and Linkoping concluded that PVC does not constitute a significant risk.

> "The clear evidence of existing PVC recycling schemes throughout Europe shows that a growing range of end of life PVC products are now being recycled to produce useful second life applications."

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