

Recycling, and management of product lifecycles

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Strategy

- Developing recycling processes, particularly for plastic products and fluorinated gases.
- Encouraging the establishment of regional and national arrangements for collection and recycling.

Lifecycle for PVC – long-term commitments, and involvement of stakeholders

Solvay is a driving force in the Vinyl 2010 voluntary commitment, which brings together all the players involved in European PVC manufacture, and aims at control of the product's whole lifecycle, from its "cradle" to "grave". The Vinyl 2010 annual reports show that the targets set for the year 2010 are being achieved:

- compliance with the charter committing to reduce emissions and releases into the environment from PVC production;
- replacing stabilisers that are either cadmium-based (target achieved) or lead-based: by 15% in 2005 (achieved), 50% in 2010 and 100% in 2015;
- recycling of 200,000 tonnes a year of PVC, at the end of the PVC products' life, independent of the recycling targets imposed by other EU Directives (on electronic waste or packaging): 149,000 tonnes recycled in 2007.
- Stakeholder dialogue and the promotion of good practices in less-developed countries form part of the voluntary commitment; there is a monitoring committee to check on progress. This committee includes representatives of the European Parliament and the Commission, NGOs and independent experts.

www.vinyl2010.org



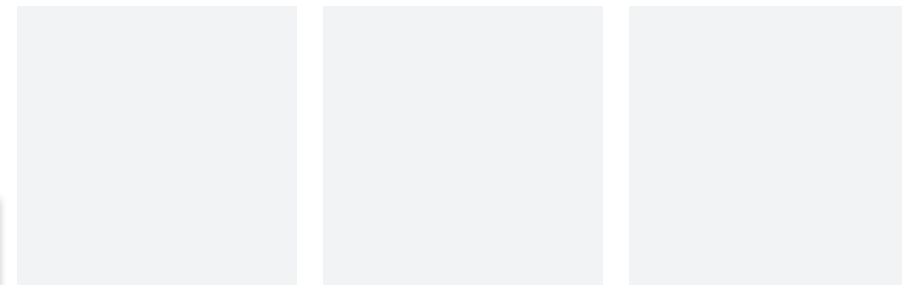
Via notably the www.figaroo.org web site, Solvay Fluor is tightly associated with the initiatives aiming at helping the customers to respect the European Regulation adopted in 2006 to minimize the emissions of HFC which behave as greenhouse gases when they are emitted. A refrigeration application among the others subjected to these constraints: The wine industry which uses coolers to control the temperature of fermentation in wine making vats.

The Ferrara (Italy) industrial recycling unit for PVC, using the VINYLOOP® process developed by Solvay, has been operating since 2001, and has a capacity of 10,000 tonnes a year. It makes use of PVC-based composites, and recycles the PVC by separating it from the other constituents by a process of selective dissolution. There is a second unit under construction at the same site, built with Ferrari Textiles, and intended for recycling of PVC-coated textiles, using the TEXYLOOP® process. Another unit with an annual capacity of 20,000 tonnes has recently been built at Kobe (Japan).

At Frankfurt (Germany), Solvay has a unit for reprocessing CFCs and HCFCs, of which tens of thousands of tonnes are still in use in the world, when they come to the end of their life. The hydrofluoric and hydrochloric acids recovered are recycled. Operating licences for the technology to destroy HFCs (see page 34), which was developed with SGL Carbon, have been granted for sites in India and Argentina. These two projects could reduce emissions by the equivalent of 5 million tonnes of CO₂ per year.

The SF₆-ReUse recycling programme implemented in Europe in collaboration with the Linde and Dilo companies has been extended to the United States. The high potential greenhouse effect of sulfur hexafluoride (SF₆), an insulating gas essential to the safety of high- and medium-voltage electrical installations, make this another substance that must be recovered and recycled at the end of its life, and it is sent to our recycling plant at Bad Wimpfen, in Germany. A similar programme is under consideration for Asia. The SF₆-ReUse concept forms part of a voluntary programme enabling the industry concerned to reduce emissions to an absolute minimum.

A process for recycling polyethylene fuel tanks, which now account for over 50% of vehicle tanks worldwide, has been developed by Inergy Automotive Systems, a joint venture between Solvay and Plastic Omnium, supported by a vehicle manufacturer and the European Union. Following recovery of the polymer, it can be used as the starting material for new fuel tanks. However, the establishment of industrial arrangements to collect the old tanks faces competition from other possible arrangements for the disposal of vehicle parts – landfill and incineration – which are at present more cost-effective but less sustainable ■



Targets for 2012

- Helping achieve the Vinyl 2010 target for PVC recycling in Europe (200,000 tonnes a year).
- Developing a partnership with a major customer for recycling of the polymer PVDC, based on VINYLOOP® recycling technology.
- Offering an SF₆ recycling service also to our customers in the Asian market.

Up for discussion

Recycling is no easy matter: having sophisticated technology is not enough.



"Solvay has already contributed to numerous high-performing industrial recycling solutions, but it is never a simple matter. In order for a viable industrial schemes to be established, a variety of interdependent conditions must be fulfilled, starting with the existence of a "raw material" source formed by effective collection of material at the end of its useful life.

"Another essential condition is that holders of the now-useless material must be faced with high costs for its disposal in landfill, or very simply a prohibition on such disposal, as in Germany. Unfortunately, it is still possible to dispose of materials in certain landfills in Europe at 50 euros a tonne! This makes it difficult to operate recycling arrangements worthy of the name.

"We must add that large quantities of plastics waste is sent to countries where the costs of labor – and of sorting – are low. This is the case in China and the Philippines with, for instance, electrical cables being taken apart by hand in China. From our perspective, these exports result in a dearth of material to recycle.

"When it comes to recycling, we could be faced with another problem. If applied literally, the REACH Directive on chemicals requires each substance

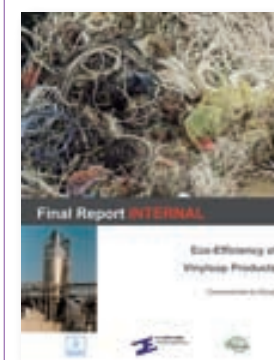
in a mixture to be identified. When you are trying to recycle materials designed and sold years ago, there is simply no cost-effective way of doing that.

"In addition, each player in a recycling sequence entirely depends on whoever is buying the recycled material. That is why our technology for recycling vehicle fuel tanks has been on the back burner for five years. The European motor-vehicle industry is for the moment in the reverse situation: crushing whole cars and then sorting out what can be recycled, rather than separating out each major component by dismantling. The industry has good reasons, of course: nowadays, vehicles being disposed of were in many cases built in the early 1990s, when people did not contemplate dismantling. We will therefore have to wait. In 2015, the EU will require 85% recycling – and including the recycling of plastics will be the only way to achieve that.

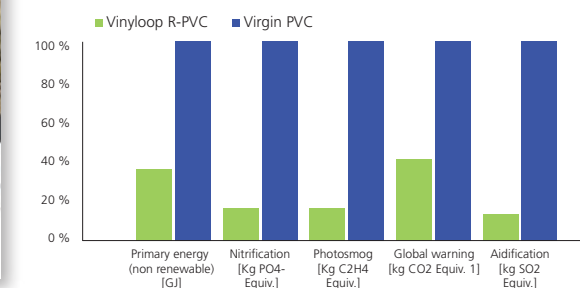
"We should remember that a producer of tarpaulins, cables or other somewhat technical equipment tends to require recycled resins to meet specifications as tight as for virgin resins. That is, inevitably, impossible. The necessary adjustments and the changes in mindset are not things we can attack alone."

Helmut Leitner

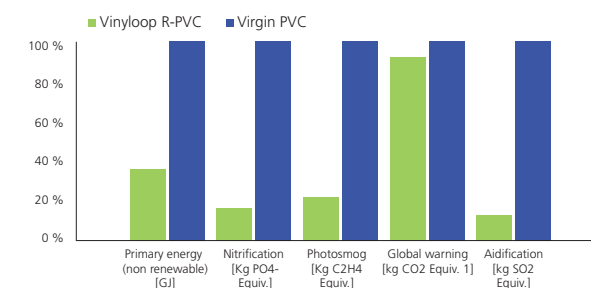
Environment Manager for the Plastics Sector



Compared environmental impacts of one tonne of recycled PVC via the VINYLOOP® process (R-PVC) with of one tonne of virgin PVC aimed at the same application



PVC for roofing application (R-PVC recovered comes from old roofing)



PVC for electric cable sheath (R-PVC recovered from old electric cables)