The European PVC industry

Contributing to sustainable development

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VINYL 2010

PVC's contribution in a nutshell

The PVC industry and its products make an important contribution to sustainable development, helping to conserve natural resources, improve people's lives and contribute to economic growth.

In Europe, the PVC industry involves 20,000 companies (mostly small or medium in size) and 530,000 employees, generating over 8 million tons of products per annum. It is also growing fast in developing countries around the world.

The main raw material for PVC is salt, a renewable resource. PVC can be recycled several times without losing its properties.

Durable, lightweight, strong and intrinsically fire resistant, PVC products provide benefits in a wide range of applications such as buildings, infrastructure projects, transportation and consumer products.

PVC packaging avoids wastage of food and protects pharmaceuticals. PVC is the polymer of choice for many medical devices.

PVC products help to protect the environment. For example, PVC pipes ensure effective sanitation and the excellent thermal insulation of PVC window frames saves substantial energy.

Cost-competitive, easy to install and almost maintenance-free, PVC products help fulfill basic needs (water supply, housing, medical care) more cost effectively than most alternative materials.

The whole PVC supply chain is working together in 'Vinyl 2010' to meet the challenges of sustainable development, with ambitious targets covering health, safety, environmental and social issues. Never before has such a broad voluntary approach involving so many companies been initiated across Europe.

PVC pipes deliver cost-effective sanitation systems.

Our responsibility in helping to achieve sustainability

"If we are to achieve sustainable development, we will need to display greater responsibility for the ecosystems on which all life depends, for each other as a single human community, and for the generations that will follow our own, living tomorrow with the consequences of the decisions we take today."

Kofi A. Annan, *Secretary-General of the United Nations, October 2001*

Polyvinyl Chloride (PVC) is an important member of the plastics family. It was one of the first polymers to be developed and the products it provides are essential components of a sustainable society.

The European industry that manufactures PVC and the products into which it is converted has grown over the past few decades, creating employment and bringing benefits to consumers. With this growth has come increased responsibility. Today this responsibility has broadened to include an important role in achieving sustainable development.

We believe our industry and its products have important roles to play in helping improve people's lives and conserve natural resources in a world that is growing in population, with ever-increasing demands for water, food, shelter, sanitation, energy, health services and economic security.

We are constantly striving to innovate – developing new products, technologies and approaches – and learn from our experience in order to advance our contribution. We are very proud of the voluntary approach that we set in motion four years ago to help us meet the challenges of sustainable development (Vinyl 2010 – The Voluntary Commitment of the PVC Industry). This is now well underway and delivering real progress.

This is the first time that such a voluntary approach involving so many companies has been initiated across Europe. We believe it could be used as a future blueprint within industry to help progress towards sustainable development.

The World Summit on Sustainable Development in Johannesburg includes the voices and perspectives of a wide range of stakeholders committed to sustainable development. We are looking forward to playing our part in the debate, meeting stakeholders, listening to their points of view and sharing our experiences.

Our commitment towards continuous improvement remains absolute and we will be using the information gathered at Johannesburg to help us carry on seeking new ways to enhance the sustainability of PVC.

PVC packaging protects important products like food.

1 PVC – a positive contribution

The World Summit on Sustainable Development in Johannesburg during September 2002 is focused on four key objectives:

- ***Protecting the natural resource base of economic development, notably freshwater, energy and land;***
- ***Integrating environment and poverty eradication;***
- ***Making globalisation sustainable, by redressing imbalances in, and generally improving, living and working conditions;***
- ***Enhancing good governance and participation.***

This document presents examples of how the PVC industry and its products make a positive contribution towards the pursuit of these objectives.

PVC products offer significant value to society through the wealth of applications in which they are used.

Examples include:

- *Pipes and reservoir linings that help the safe and cost-efficient provision of drinking water and sanitation;*
- *Window frames that offer tremendous energy-saving potential at low cost;*
- *Coated fabrics that make emergency shelters to help people at times of disaster;*
- *Medical devices with unrivalled performance characteristics and cost-efficiency;*
- *Packaging that preserves foods and pharmaceuticals, thereby protecting health and reducing waste;*

PVC's contribution is by no means limited to its products. The PVC industry is also setting a unique example in the process of working together as a supply chain.

CO-OPERATION WITHIN THE INDUSTRY

The European PVC industry has adopted an integrated approach towards product stewardship, from cradle to grave. This led to the signature of the Voluntary Commitment of the PVC Industry in March 2000.

This Voluntary Commitment has since been developed to address comments received during extensive public and political consultation. Points raised by the European Commission's responsible Directorates General Environment and Enterprise, the European Parliament and Member States have also been addressed. As a result, an updated version called Vinyl 2010 – the Voluntary Commitment of the PVC Industry was signed in October 2001.

Vinyl 2010 sets out actions that the PVC industry will undertake during the period 2000 – 2010 and beyond.

These will apply to:

- *PVC manufacture*
- *Additives – plasticisers and stabilisers*
- *Waste management*
- *Social progress and dialogue*

Vinyl 2010 also provides the structural and legal framework for effective management, monitoring and financing of these actions.

This voluntary approach is unique. No other industry has ever compiled a plan of action towards meeting the challenges of sustainable development of this kind through such an open process that covers the entire production chain. It builds upon the principles of Responsible Care® and represents the culmination of work by the PVC industry during recent decades. The signature in 1995 of the first ECVM Charter for PVC production was an important milestone for this work.

Through Vinyl 2010, the industry is working with all stakeholders to meet the challenges of sustainable development in a way that embodies the principles of openness, participation and good governance.

PREVIOUS STUDIES ON PVC AND SUSTAINABLE DEVELOPMENT

The lifecycle impacts of PVC have been well studied over the past two decades. However, only a limited number of these investigations have looked at the material in the broad context of sustainable development, starting with initiatives in Germany and the UK around 1994.

One such study, entitled 'PVC und Nachhaltigkeit' (PVC and sustainability) was undertaken by E.Plinke et al (Prognos) and published by DIV Köln (Cologne) in 1999. This work was steered by a group of independent scientists, the industry and NGO representatives. It assessed four products made from PVC (windows, pipes, packaging, cables) against commonly used alternative materials over the short, medium and long terms, focussing on ecological, economical and social impacts.

PVC products were found to have the highest sustainability potential in the short and medium term compared with those made from alternative materials. Prognos acknowledged that the accuracy of results reduces as the time horizon expands. In the longer term, Prognos foresaw potential problems with the use of non-renewable resources. All petrochemical products share such problems, although PVC performs better than some because it relies on a smaller proportion (46%) of petrochemical feedstock.

It is important to appreciate that there are differences in definition between sustainable development and sustainability. Sustainable development is the process or journey we must take to arrive at the destination of sustainability - or in other words the process of moving towards sustainabilty. Sustainability is a defined state and in the context of PVC a definition has been proposed by The Natural Step, a Swedish organisation with a unique approach towards assessing sustainability. The definition is included in their report "PVC An Evaluation of Using the Natural Step Framework", July 2000, by Dr M. Everard & M. Monaghan and is made of a series of clearly defined science-based constraints and systems presented as five long-term challenges:

1. *The industry should commit itself long-term to become carbon-neutral;*
2. *The industry should commit itself long-term to a closed loop system of PVC waste management;*
3. *The industry should commit itself long-term to ensuring that releases of persistent organic compounds from the whole lifecycle do not result in systematic increases in concentration in nature;*
4. *The industry should review the use of all additives consistent with attaining full sustainability, and especially commit to phasing out long-term substances that can accumulate in nature or where there is doubt regarding toxic effects;*
5. *The industry should commit to the raising of awareness about sustainable development across the industry, and the inclusion of all participants in its achievement.*

The Natural Step has made it clear that these challenges are shared by many other industries. With respect to 'carbon neutrality', PVC is actually better placed than many materials to meet the challenge they have set. Additional challenges in respect of economic and social issues are currently being investigated.

2 The three pillars of sustainable development: ecology, economy and society

2.1 Ecology

PVC PRODUCTS BRING ENVIRONMENTAL BENEFITS

Whilst all products have some environmental impact, this should be measured against their benefits to society. Many PVC products make a significant contribution to environmental protection over their lifecycle. Here are three examples:

WATER CONSERVATION AND POLLUTION PREVENTION

"The fastest and cheapest solution (to the increasing demand for freshwater) is to expand the productive and efficient use of water. In many countries, 30% or more of the domestic water supply never reaches its intended destinations, disappearing from leaky pipes, faulty equipment or poorly maintained distribution systems"

Scientific American, February 2001.

Easy to install, cost-efficient and low-maintenance PVC piping systems help reduce the loss of drinking water and prevent pollution by providing strong and corrosion-resistant sewage systems.

ENERGY SAVINGS

The insulating properties of window frames made from PVC allow substantial savings in energy consumption to be made.

A study by the Testing Institute for building elements in Pirmasens ("Energieeinsparpotentiale durch Moderne Fenster", Prüfungsinstitut für Bauelemente GmbH, Pirmasens, Germany) estimated that the total potential energy saving if modern PVC window profiles were installed throughout Western Europe to replace the windows currently in place could be 50 billion kWh. That equates to a saving of 8 million tons of crude oil.

LONG-LIFE PRODUCTS

A large proportion of PVC products have long lives, ensuring maximum use is made of the natural resources consumed in their manufacture. By selecting PVC, the resulting products are more durable than if made from materials with a shorter lifecycle. They make more effective use of natural resources and they take longer to enter the waste stream.

In more than 50% of applications in which PVC is used, the products last over 35 years. For example, PVC window profiles have an estimated lifetime of between 40 and 100 years. Many PVC products allow multiple and continued use, with single-use products normally restricted to applications in which safety and hygiene are key considerations, e.g. food packaging and medical products. This property, along with the recyclability and durability of PVC, makes it one of the most resource efficient materials available for many applications.

Combined with durability, PVC products are also often lightweight and strong, making them a popular choice within the construction industry. In 1999, approximately 5.7 million tons of PVC products were used in construction projects around Europe.

CONTINUOUS IMPROVEMENT IN MANUFACTURING PROCESSES

A key element of product stewardship is responsible manufacturing. There have been concerns over the environmental impact of PVC production in recent years and the industry has been voluntarily working hard to address them.

A commitment towards continuous environmental improvement was formally established through the adoption of two voluntary charters that were signed by European PVC resin producers.

The first charter for Suspension PVC production was signed in 1995. In 1999 independent auditors reported the industry had achieved 88% compliance with the targets that had been set. This level of compliance had been achieved through ECVM member companies investing 233 million euro.

Since the initial audit, companies that did not fully comply have been working on solutions to achieve full compliance and an internal survey carried oout in 2001 showed that compliance level had reached 96%. A new independent external verification of compliance across the industry against S-PVC Charter standards will be completed before the end of 2002.

The success of this first charter in achieving substantial emission reductions

PVC pipes help deliver safe drinking water.

has been illustrated by the fact that total yearly atmospheric emissions of Vinyl Chloride Monomer (VCM) from plants belonging to ECVM members in Western Europe have reduced by a factor of 7 between 1989 and 1999.

In 1999, ECVM members signed a new charter covering Emulsion PVC, thus ensuring virtually all European PVC production is covered by environmental standards that go beyond the requirements of European, national and local legislation. Compliance with this additional charter will be independently verified in 2003.

RESOURCE EFFICIENCY AND GREENHOUSE GAS EMISSIONS

One of the main materials used in PVC production is common salt, a plentiful and renewable resource. This means PVC requires less oil for production and emits about 50% less carbon dioxide than some other polymers if incinerated at the end of its useful life. It can be recycled on an industrial scale for most of its applications and the PVC industry is investing in the development of recycling technologies across Europe to significantly increase recovery levels.

The PVC industry is mature and as a result few new plants have come on-stream in Europe during the last decade. Even though the potential for significant improvements in energy and raw materials consumption across the sector is now limited, many companies have committed to energy efficiency targets within their own operations.

Within the framework of Vinyl 2010, PVC resin, plasticiser and stabiliser manufacturers are committed as individual companies to:

- *Continue to improve their resource consumption (material and energy use) during manufacture;*
- *Set ongoing targets to reduce resource consumption where economically and ecologically this is warranted;*
- *Review their progress towards such targets on an annual basis.*

WASTE MANAGEMENT SOLUTIONS CONTRIBUTING TO REDUCED RESOURCE CONSUMPTION

The European PVC industry is working to develop environmentally responsible solutions for managing its products at the end of their useful life. A number of recovery options are available prior to disposal, with the appropriate mix defined by cost-effectiveness and efficiency in the context of each waste stream.

Mechanical Recycling

Mechanical recycling makes ecological and economic sense where sufficient quantities of homogeneous, separated and sorted waste with low contamination levels are available.

In these cases, the quality of recycled material often allows production of the same or similar products. Products such as pipes, roof coverings and window profiles are currently being recycled in this way within a number of EU member states. The PVC industry is seeking to expand these recycling programmes across Europe through activities included within Vinyl 2010.

Mechanical recycling of mixed plastic waste is also possible to a limited extent. The PVC industry recognises the need to improve sorting and recycling techniques for mixed plastic waste, and will be seeking to improve the situation through actions included within Vinyl 2010.

In-house recycling of PVC fabrication waste is already at a high level. Take-back schemes have also been set up in recent years to recycle PVC waste from processing and installation work. By the end of 2002, the PVC industry will have quantified the generation and sources of this waste so that meaningful improvement targets can be set.

In 1990, the Dutch Federation of Manufacturers of Plastic Piping Systems (FKS) decided to develop a recovery infrastructure for PVC pipes and techniques to provide high quality reprocessed

material. The reprocessed material from this initiative is used to produce a co-extruded non-pressure sewage pipe with external layers of virgin PVC and an intermediate layer of recycled material.

FKS has also co-funded a lifecycle analysis study of recycled PVC pipes in comparison with alternative materials. The key conclusion was that recycled pipes produced by the FKS scheme had a comparable or even better environmental profile compared with traditional concrete and clay pipes.

With respect to end-of-life PVC products, four sector associations have committed to mechanically recycle at least 50% of the collectable available quantity of waste by 2005 (2008 for flooring):

- *The plastics pipe and fitting sector, represented by TEPPFA (The European Plastics Pipes and Fittings Association);*
- *The window frame sector, represented by EPPA (European PVC window Profile and related building Products Association);*
- *The flooring sector, represented by EPFLOOR (EuPC PVC Flooring Sector Group);*
- *The roofing membranes sector, represented by ESWA (European Single ply Waterproofing Association).*

Composite products are particularly difficult to recycle because of the need to separate polymer fractions from other materials. A new closed-loop recycling process called Vinyloop® has been developed by one European PVC producer. It can be used to recycle single or composite PVC materials. This innovative process involves shredding waste, dissolving it in a solvent solution to separate the components and PVC recovery by precipitation, separation and drying. The technology is now being commercially developed on an industrial scale. A first 10,000 t/y unit started up at the beginning of 2002 at Ferrara in Italy. Several other projects are under consideration.

Feedstock Recycling

Feedstock recycling is particularly well suited to mixed plastics waste. A number of technologies are currently being developed with financial support from the industry, all based on the principle of breaking down PVC into its chemical components prior to recovering them for re-use within a range of industrial processes. In the case of a PVC rich feedstock, hydrochloric acid is one of the main components that can be recovered via this method for use as a raw material in PVC production.

One example of a feedstock recycling trial being supported by more than 3 million euro of industry investment is a pilot plant located at Tavaux in France. This is the first project of its kind within Europe to be undertaken on such a scale, with a capacity of up to 2,000 tonnes a year. Trials commenced in 2001 and the initial results are expected at the end of 2002. Trials of other technologies are being undertaken in Germany and Denmark, as well as in Japan.

Together with the development of additional mechanical recycling and feedstock recycling schemes, the industry has voluntarily committed to recycling 200,000 tons of post-consumer PVC waste in 2010. This target has been set in addition to the volume of post-consumer recycling in 1999 and to extra recycling required by EU Directives on packaging waste, end-of-life vehicles and waste electronic and electrical equipment.

Incineration with energy recovery

Incorporating PVC waste in controlled municipal incinerators reduces the need for additional fuel and ensures that the calorific value of the oil used in PVC production is recovered.

Chlorine is naturally present in the waste stream of all incinerators and a number of independent studies have demonstrated that adding PVC does not increase the generation of potentially harmful emissions.

PVC usually represents less than 1% by weight of the material handled in a typical municipal waste incinerator. Moreover, modern incinerators are operated to the highest standards and equipped with pollution control equipment that minimises the formation or release of emissions to the environment to ensure they operate within strict regulatory levels.

Concerns have been expressed over the volume of waste residue created by the pollution control processes employed within incinerators handling PVC waste. There are two industrially applied technologies that prevent or deal with such residues. One is the recovery of HCl as a product in modern incinerators such as the MVR plant in Hamburg. The other is neutralization by bicarbonate and the recycling of the purified salts as a raw material in the chemical industry (Resolest - to be started at 50,000 t/y capacity this year at Nancy in France)

A study by the Dutch TNO Institute of Environmental Sciences, Energy Research and Process Innovation concluded that the overall negative public perception of PVC in municipal waste incineration is not supported by scientific, financial or ecological evidence. It also found that elimination or large-scale removal of PVC from the waste stream would not lead to any substantial ecological gain.

Concerns have also been expressed about potential dioxin emissions resulting from incineration of PVC waste. In its Green Paper on PVC, published in 2000, the European Commission recognised that:

"…the influence (of the chlorine content) on the reduction (of dioxin formation) is also expected to be a second or third order relationship. It is most likely that the main incineration parameters, such as the temperature and the oxygen concentration, have a major influence on the dioxin formation."
"…at the current levels of chlorine in municipal waste, there does not seem to be a direct quantitative relationship between chlorine content and dioxin formation."

These conclusions by the European Commission are based on more than ten in-depth studies carried out in various parts of the world. Modern incinerators have very low dioxin emission levels and these levels are not affected by the presence of PVC.

THE POSSIBILITY OF PVC PRODUCTION BASED ON RENEWABLE RESOURCES

Over 50% of PVC is made up by chlorine and less oil is required in its production than any other major polymer.

Improving the sustainability of production processes based upon the non-renewable resource of oil is a challenge shared by the whole petrochemical industry. This challenge needs to be tackled on a global scale.

The production of plastics demands approximately 4% of global oil consumption. Production of PVC represents less than a quarter of the total demand for plastics. Whilst there are some processes available for deriving feedstocks for plastics production from renewable sources (e.g. production of small quantities of PVC from molasses waste in India), most are not economically viable at present.

The plastics industry participates in the activities of a working group on Renewable Raw Materials set up by the European Commission. This group will assess the benefits to all stakeholders and investigate policies and measures to ensure continued R&D funding, increase consumer awareness, encourage industry voluntary agreements and propose incentives for wider use.

THE RESPONSIBLE USE OF ADDITIVES

There has been considerable debate around the use of additives in the production of PVC. All polymers, including PVC, require additives such as stabilisers and processing aids. Flexible PVC requires plasticisers.

STABILISERS

Stabilisers are necessary in all PVC formulations to prevent decomposition by heat during processing. They also have an important influence on physical properties of the material.

The main constituents of current stabiliser systems are metallic compounds derived from lead, barium, tin, calcium or zinc. In Europe, the use of stabilisers is regulated in drinking water pipes, medical, food-contact and packaging applications by a combination of EU directives and national regulations.

As part of Vinyl 2010, the PVC industry has phased out the use of cadmium in all stabiliser systems placed on the European market since March 2001. Stabiliser producers currently spend up to 5 million euro annually on researching and developing alternative systems to the widely used lead-based options.

ESPA and EuPC have committed to replace lead stabilisers to achieve the following reduction targets measured on the basis of consumption levels in 2000:

- ***minus 15 percent in 2005***
- ***minus 50 percent in 2010***
- ***minus 100 percent in 2015***

PLASTICISERS

Flexible PVC uses plasticisers to give it the desired properties for a number of applications. These substances have been the subject of considerable media, legislative and scientific debate.

Plasticised PVC has been used for more than 40 years without a single known case of harm to human health. The environmental effects of plasticisers are also known to be minimal. In response to the public debate, academics and industry have been working together to conduct the necessary research that addresses the concerns raised. The latest research findings are an invaluable input to the EU risk assessments that are currently being carried out on phthalate plasticisers.

The plasticisers industry will continue to conduct research in order to provide scientific studies and expertise to help policy-makers make well-informed decisions at the earliest opportunity. It currently spends approximately 1 million euro a year on such research and is improving the scientific database of its products consistent with the principles of Responsible Care®. Information from the database will be used to propose improvements based on the results of EU risk assessments.

Completion of the major phthalate risk assessments is expected in 2002. If warranted by the results, appropriate risk reduction measures will be taken by industry. An eco-profile report was published in 2001 and will be regularly updated to provide the basis for additional lifecycle work covering plasticised PVC products.

As part of its Voluntary Commitment, the European PVC industry will continue to invest in research that brings a better understanding of the environmental and health issues surrounding PVC additives. The use of additives within production will continue to be based on sound scientific risk assessments and the industry will work with European authorities to ensure their approach remains in line with the principles of sustainable development. The preliminary results of the risk assessments show already that some widely used phthalate plasticisers (DIDP, DINP) do not need additional risk reduction measures.

PVC plays an important role in infrastructure projects.

2.2 Economy

A sound economy is a fundamental element of sustainable development. Cost optimisation frees resources that can be used for financing ecological and social improvements.

COST EFFECTIVE PRODUCTS AND CONTINUOUS IMPROVEMENT IN LIFECYCLE COSTS

As a material, PVC provides the solution for affordable products that offer great value to society. In particular, they can be used to meet essential demands such as the supply of clean water and low cost healthcare.

The competitiveness of PVC products in terms of lifecycle costs against alternative materials results from their efficient production and conversion processes, low maintenance needs in durable applications, long life, ease of transportation and installation due to comparative low weight, and reduced number of elements to be assembled.

WIDE RANGE OF USES

PVC is one of the three highest volume polymers. PVC products have gained significant economic importance in most industrial sectors: building and civil engineering, agriculture, clothing, transportation, medical care, etc. Some examples of these applications are detailed in section 2.3.

All these sectors benefit from the cost effectiveness and unique properties of PVC. Durability, ease of maintenance and lightness have been mentioned already. The chemical and biological inertness and low natural flammability of PVC products provide additional safety and health benefits.

COST EFFECTIVE PVC PRODUCTS CAN CONTRIBUTE TO ENVIRONMENTAL AND SOCIAL IMPROVEMENT

Use of cost effective products frees resources which can be used for useful environmental and social improvements. Two examples illustrate this point:

- *Due to the cost efficiency of plastic pipes in general, and PVC pipes in particular, for a given amount of money more settlements can be provided with clean drinking water and waste water disposal.*
- *For a given amount of money more PVC windows with excellent thermal properties can be installed than windows from other materials having equivalent insulation properties. In this*

way PVC can contribute efficiently to reducing energy consumption and greenhouse gas emissions. Since heating in many countries uses non-renewable resources, the result can be a significant saving of such resources.

In general, cost effective products in essential sectors such as sanitation, housing and medical care can be afforded by less affluent people, helping to redress social imbalances.

Cost effective products therefore have a huge potential for environmental and social improvement. Customers, citizens and decision makers throughout the world should be made aware of this fact and work together to realise this potential.

A COMPETITIVE INDUSTRY EMPLOYING STATE-OF-THE-ART TECHNOLOGY

Economic progress through profitable industrial activity and increasingly cost-effective products is a normal process that brings benefits. History shows that most of the benefits go to customers.

Rationalisation within the industry in recent years has resulted in the replacement of many smaller old plants by a limited number of modern plants or capacity increases at some of the more efficient existing plants. This process has improved the efficiency of European production, raising average plant capacity to about 150 kt per annum. The most modern operations typically have capacities of between 200 and 300 kt per annum. The average PVC plant in the USA has a capacity of 350 kt per annum, so there is clearly room for further improvement of European production efficiency.

One of the results of competition and rationalisation is that the price of PVC resin has remained approximately constant over the last 20 years when expressed in a stable currency such as the German mark. Over the same time, the customer price index has more than doubled.

A SIGNIFICANT CONTRIBUTION TO LOCAL ECONOMIES

In Europe alone, more than 20,000 companies are directly involved in the PVC production chain. Most of these are small and medium-sized companies which support local economies. The European market reached approximately 8.36 million tons of PVC products in 2000 with sales estimated at 74 billion euro.

In other parts of the world PVC also contributes significantly to the economy.

The long-term economic viability of the PVC industry is a goal shared between companies throughout the supply chain and the people they employ. Future growth and prosperity is therefore a subject of regular deliberation between the industry and the European Mine, Chemical and Energy Workers' Federation (EMCEF).

2.3 Society

PVC PRODUCTS CONTRIBUTE POSITIVELY TO HUMAN HEALTH AND SAFETY

PVC provides the material for affordable products that protect and preserve life. Here are a few examples:

- *PVC pipes are used worldwide to provide clean water supplies. They are equally important for collecting used water and sewage, thereby providing sanitation and protecting health. The functionality and cost-effectiveness of PVC pipes make them particularly important in developing economies, where they play a vital role in the development of infrastructure within the constraints of limited budgets.*

- *The safety and reliability of PVC makes it by far the most widely used medical polymer. It is used for the benefit of patients in applications ranging from blood bags and catheters through to operating theatre floors. It has a proven track record of over 40 years of safe use within the healthcare sector and meets stringent hygiene standards.*

- *PVC contributes towards the provision of affordable housing and hence provides shelter, one of the basic human needs.*

- *PVC packaging protects and preserves products, including many kinds of food and pharmaceuticals. It keeps food fresh and uncontaminated, protecting health and preventing unnecessary wastage.*

PVC helps improve agricultural productivity.

PVC packaging helps the safe distribution of medicines.

- *Tough, reliable PVC is the material for survival equipment such as life jackets, rescue boats, air safety equipment, vehicle air bags and protective clothing.*

PVC PRODUCTS OFFER AN AFFORDABLE MEANS TO IMPROVING LIVING STANDARDS

PVC products are durable, lightweight, strong and intrinsically fire resistant, so they are widely used within the construction of housing and important infrastructure projects such as public buildings, pipelines and tunnels.

PVC provides long-lasting and cost-effective solutions for roofing, window frames, electrical equipment, flooring, wall coverings and even complete pre-fabricated houses. The use of PVC in these applications brings reduced maintenance (e.g. no repainting of window frames) and improved living standards (e.g. affordable double glazing systems).

PVC also provides cost-effective and durable components for many transport applications, including airplanes, trains, lorries and cars. The use of PVC and other plastics makes modern vehicles longer-lasting, lighter, more fuel efficient and therefore less expensive to run.

PVC not only enhances living standards but also the quality of life, particularly in the field of design. For many designers, PVC provides the raw material in a multitude of forms for products such as furniture, lighting, textiles and clothing.

THE PVC INDUSTRY: A VALUABLE ECONOMIC ASSET TO SOCIETY

The industries directly linked to PVC production – such as converters and machinery manufacturers – as well as the polymer producing industry, are significant employers.

PVC directly and indirectly supports over 530,000 jobs throughout Europe.

The contribution that PVC makes to economic development around the world is reflected in the relationship between consumption and Gross Domestic Product (GDP). PVC consumption generally outpaces GDP in many countries with the difference being most marked in developing economies and emerging markets. This is largely a result of natural growth in consumer demand for products and services (e.g. construction, transport, packaging and healthcare).

IMPROVING WORKING CONDITIONS AND TACKLING SOCIAL ISSUES

European PVC industry employers (ECVM, ECPI and ESPA) and the corresponding union (EMCEF) signed a social dialogue charter in October 2000 to work together on tackling issues concerning the sector's future and their effects on employees.

Through this charter, the PVC industry commits to:

- *The development of European health, safety and environmental standards through regular discussions on PVC research activities and findings, sharing plans and developing employee information;*
- *The development of standards for employees' initial and further training;*
- *The transfer of standards to EU accession countries through co-operation and regular information exchanges;*
- *A dialogue on European works councils about the development of the PVC industry against the backdrop of European policy.*

PVC production, similar to other activities within the chemical industry, has an excellent safety record compared with the manufacturing sector as a whole.

ECVM members have a long history of sharing information about safety incidents during production and transportation. Significant events are extensively discussed at a yearly meeting of production managers and safety engineers.

ECVM members have for a long time actively supported the efforts of the International Agency for Research on Cancer (IARC, an organisation belonging to the World Health Organisation) in its investigations into the carcinogenic effects of vinyl chloride (the monomer used to produce PVC).

As soon as the link was established in the mid 1970s

between angiosarcoma of the liver (ASL), a rare form of cancer, and exposure to very high levels of vinyl chloride, the companies producing PVC undertook major changes to production processes in order to reduce exposure levels. ECVM also set up and has maintained a worldwide register of ASL cases. The updated aggregate data, stripped of all personal information, will soon be published in scientific literature. It is important to highlight that no new ASL cases have been reported to ECVM for workers whose first exposure to VCM occurred after these exposure reduction measures were implemented.

ECVM members have been closely monitoring the health of their workers for a long time. In 2001 the Board of ECVM decided to put in place as from January 2002 a health surveillance protocol for their workers exposed to vinyl chloride. This protocol sets minimum standards of monitoring across Europe, which does not prevent individual member companies to apply even more stringent standards.

ECVM has also supported investigations into the possible health effects of PVC dust. Both in vitro and in vivo animal studies are being undertaken at the University of Leuven and in 2002 an epidemiology study of workers exposed to PVC dust was initiated. A common standard has been agreed to measure the level of PVC dust at all members' plants in a consistent way at regular intervals.

Through Vinyl 2010, the PVC industry has committed to help improving health, safety and environmental standards in EU accession countries. A seminar was held in Warsaw during 2001 where relevant information was made available and widely discussed amongst representatives of companies, trade unions and public institutes in the candidate countries.

PVC provides durable and hygienic flooring.

3 The PVC industry – who are we and what are we committed to?

Four associations representing the whole production chain in Western Europe (ECVM, ECPI, ESPA and EuPC) have signed Vinyl 2010 – the Voluntary Commitment of the PVC Industry with the goal of meeting the challenges of sustainable development.

This voluntary commitment is a 10-year programme, including targets that will be reviewed in 2005. New objectives will be defined in 2010 to take account of technical progress and EU enlargement. Implementation will be monitored by an independent committee and progress communicated through externally verified annual reports.

A formal legal entity called 'Vinyl 2010' has been set up to oversee implementation. This organisation will represent the whole PVC industry chain in partnerships with interested parties and manage allocation of the financial support provided through the four associations for the development of new technologies and recycling schemes. Financial contributions of up to 25 million euro per year may be made over the 10 years covered by this programme.

More information about the Voluntary Commitment and Vinyl 2010 can be found at www.vinyl2010.org.

The European Council of Vinyl Manufacturers

ECVM is a division of the Association of Plastic Manufacturers in Europe (APME). Its membership includes the 10 leading European PVC producers

www.ecvm.org

European Plastics Converters

EuPC represents approximately 30,000, predominantly medium-sized, plastic processing operations in Europe. The individual members represent a total processing capacity of more than 30 million tons of plastic per year.

www.eupc.org

The European Stabilisers Producers Associations

ESPA represents the whole of the European stabilisers industry through its four branches:

- European Lead Stabilisers Association (ELSA)
- European Tin Stabilisers Association (ETINSA)
- European Calcium Organic Stabilisers Association (ECOSA)
- European Liquid Stabilisers Association (ELISA)

http://espa.cefic.org

The European Council for Plasticisers and Intermediates

ECPI represents the interests of 11 member companies that are involved in the production of plasticisers.

www.ecpi.org


PVC cables help deliver essential services like electricity.