Voluntary commitment of the PVC industry
Polyvinyl Chloride (PVC) has made a positive contribution to socio-economic development for the past 50 years, not only in Europe but also across the world.

PVC is one of the major thermoplastic materials. Its uniquely versatile performance delivers substantial benefits, making it the material of choice in many applications and sectors in our modern society; construction, transportation, electronics and health. Demand for PVC has increased continuously in line with social development. Today, worldwide demand exceeds 25 million tonnes annually.

PVC has been the subject of much debate and scrutiny over recent decades covering many aspects of its lifecycle. Numerous independent studies have broadly concluded that PVC is an eco-efficient material which, when responsibly managed from cradle to grave, provides sustainable benefits to society.

The PVC industry (PVC manufacturers, PVC additive producers and PVC converters as represented by their European Associations ECVM\(^1\), ECPI\(^2\), ESPA\(^3\), EuPC\(^4\)) is uniting voluntarily to meet the challenge of sustainable development. It has adopted an integrated approach to deliver the concept of responsible cradle to grave management, culminating in the signature of a ‘Voluntary Commitment of the PVC Industry’. The PVC industry employs 530,000 people in Europe.

The Voluntary Commitment builds on the principles of Responsible Care\(^4\) and addresses key issues for each part of the lifecycle. The first section covers manufacture of the primary materials (PVC, plasticisers and stabilisers) and focuses on continuous improvement in environmental impact and utilisation of key resources. The second section addresses the responsible and sustainable use of additives which, when formulated with PVC, allow innovative development of the material. The third section describes how the industry intends to play its part in responsible management of the product at the end of its useful life. The fourth section details the process by which the PVC industry will manage the delivery of various commitments, including the provision of financial resources.

With this Voluntary Commitment, the PVC industry undertakes to implement important principles and actions covering the period 2000 – 2010. Targets are fixed for the first five years and will be redefined for the following five years in 2003.

An annual progress report will be published by the end of March for each previous year and this will be made available to all interested parties.

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1 European Council of Vinyl Manufacturers
2 European Council for Plasticisers and Intermediates
3 European Stabilisers Producers Association
4 European Plastics Converters
The PVC Voluntary Commitment embraces the principles of Responsible Care® and follows the general concepts and guidelines when setting out specific undertaking in this document. In particular, the criteria regarding parties, subject, definition of terms, quantified objectives, staged approach, specification of obligations, monitoring of results, periodic reporting, access to information, collection, evaluation, verification of results, accession of third parties, duration and revision have been taken into account.

**OBJECTIVES**

The Chemical Industry has been committed to continuous improvement as defined by Responsible Care®, and the implementation of product stewardship ideals. With this Voluntary Commitment, the PVC industry takes a further step towards sustainable development.

All sectors working with PVC are involved, from PVC manufacturers to additive producers and converters. The PVC industry looks forward to involving stakeholders in the process of finalising the Commitment and also ensuring public awareness for this initiative.

**CONTENT**

The essential elements of this Commitment are verifiable objectives and quantifiable targets. These will be set out with interim deadlines to provide a staged approach to reaching the ultimate objectives.

The annual results will be made publicly available. In line with our commitment to openness, the reports will be thorough and fully transparent.

An independent, third party will be chosen to verify and evaluate the results of the monitoring. Finally, the fulfilment of the objectives will be reviewed in 2003 and again in 2008 so that targets can be revised taking into account technical progress and stakeholder suggestions.

Reflecting the varied nature of the PVC business, the Voluntary Commitment is composed of several components covering the product lifecycle.
2.1 PVC Manufacture

The first stage in the lifecycle of PVC is its manufacture and here we highlight the importance of product stewardship and eco-efficiency.

Compliance with ECVM Industry Charter for production of Vinyl Chloride Monomer (VCM) and Suspension PVC

PVC manufacturers commit to ensuring that each VCM and Suspension PVC plant in Europe fully complies with the 1995 ECVM Charter. The environmental criteria are compatible with the “Best Available Technique” (BAT) recently adopted by the OSPAR Commission. For the Charter, an independent compliance audit was carried out in April 1999 and results were published in July 1999. Reports assuring full compliance will be available in June 2000.

The potential for further plant optimisations will be investigated in 2001.

Implementation of the ECVM Industry Charter for the manufacture of Emulsion-PVC

PVC manufacturers commit to comply with the Emulsion PVC Charter signed in February 1999. The Charter’s deadline for compliance is the end of 2003 and compliance will be externally audited and published by mid 2004.

Drive to improve the eco-efficiency of PVC resin, plasticisers and stabilisers manufacture

Eco-efficiency is a concept at the heart of the World Business Council for Sustainable Development (WBCSD) philosophy. Eco-efficiency is a combination of economic and ecological efficiency and this concept is supported by the PVC industry. On this basis, PVC resin, plasticiser and stabiliser manufacturers commit 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.

2.2 Additives

Additives play a key role in creating the unique range of performance characteristics, which allow the innovative development of PVC applications. Essentially, additives include stabiliser systems to ensure durability and plasticisers to give a range of flexibility.

The use of these materials is subject to a range of existing regulations. The field of regulation is continuously evolving with risk assessments playing an important role. The PVC industry fully supports and is deeply involved in the regulatory process. The PVC industry commits itself to the following actions with respect to the future use of plasticisers and stabilisers:
2.2.1 Plasticisers

- The plasticisers industry will continue to conduct research in order to provide scientific studies and expertise to help policy-makers develop well-informed decisions at the earliest possible time. In 1999 the industry spent approximately 5 million euro on such research.
- The sector will continue to improve the already sizeable scientific database of its products consistent with Responsible Care® principles and use it to propose improvements based on the results of EU risk assessments. Risk assessments of the major phthalates are expected to be completed by the end of 2000. If warranted by the results, appropriate risk reduction measures will be taken.
- Industry supports the concept of Lifecycle Analysis (LCA) evaluation of materials in order to highlight possible improvements. It will work towards completion of a database on various plasticisers for PVC to achieve this goal. It is anticipated that this will be completed by the end of 2000.

2.2.2 Stabilisers

- The use of cadmium in all stabiliser systems placed on the European market will be phased out within one year, taking into account technical feasibility in line with Council Resolution of 25 January 1988 (88/C 30/01). This means that no members of ESPA will sell such products in the European Union, Norway and Switzerland, and that EuPC will communicate to its members not to use cadmium based stabilisers.
- Currently there is no unacceptable risk identified in the use of cadmium stearate and laurate which would preclude the continued recycling of these products. ESPA members will continue to work with the Commission on targeted risk assessment for such products.
- Accepting recycling of applications containing cadmium is the best means to avoid dissemination of cadmium into the environment.
- ESPA members commit to carrying out initial risk assessments on lead-based stabilisers under the CEFIC and ICCA programmes “Confidence in Chemicals” by 2004. National Regulators in a number of EU countries approve the use of lead stabilisers for drinking water pipes, based on a risk assessment. A European approval scheme is also currently under development for drinking water pipes.
- ESPA members will continue to research and develop alternative stabilisers to the widely used and highly effective lead-based systems. In 1999, ESPA members spent approximately 5 million euro on this activity.
- ESPA will produce yearly statistics showing which stabilisers are purchased by the converters. It will also produce statistics showing which stabilisers are being used in window and profile production, pipe and cable applications. Based on the current PVC volume it is anticipated that the 120,000 tonnes of lead stabiliser sold in Europe in 1999 will decrease to 80,000 tonnes in 2010. ESPA will support this trend by developing suitable alternatives.
2.3 Waste Management

The PVC industry supports an integrated waste management approach, which aims to maximise the efficient use of raw materials and utilise the best end-of-life treatment option per waste stream.

2.3.1 Voluntary commitment to develop recycling schemes

The PVC industry will examine how recycling schemes already operating in some European countries (e.g. German scheme for PVC window frames as well as several schemes for pipes) could be expanded for use in other EU countries.

a) Mechanical recycling

In-house recycling of PVC fabrication waste is already at a high level of conversion efficiency.

Take-back schemes have been set up in recent years to recycle PVC waste from processing and installation works. By the end of 2002 the industry will have identified the generation and sources of this waste category to set meaningful improvement targets.

For the mechanical recycling of end-of-life PVC products, the PVC industry will examine the various applications for recycling potential against the following criteria:

- Products should be easy to sort and easy to identify for separation into clean fractions, suitable for further treatment;
- Sufficient quantities should be collected to fill industrial plant capacities, with waste transported within reasonable distances;
- Quality of recyclate should match marketable applications at competitive economic conditions.

Quantified commitments are made for:

The Plastics pipe and fitting producers, represented by TEPPFA, commit to mechanically recycle increasing quantities of PVC pipes and fittings at their end-of-life. The commitment is to recycle at least 50% of the collected available quantity of pipe and fittings waste by 2005.

- Target in 2003: 25%
- Target in 2005: 50%

Implementation:
On the basis of prior experience and through start-up of new recycling schemes and improving existing recycling schemes.

Reporting and monitoring:
An annual report will be provided to the European Commission.

Revision of targets:
On the basis of third party assessments after the initial period.
The window frame sector, represented by EuPC, commits to mechanically recycle increasing quantities of PVC window frames at the end of life of this application. The commitment is to recycle at least 50% of the collectable available quantity of window profile waste by 2005.

**Target in 2003:** 25%
**Target in 2005:** 50%

**Implementation:**
On the basis of prior experience and through start-up of new recycling schemes and improving existing recycling schemes.

**Reporting and monitoring:**
An annual report will be provided to the European Commission.

**Revision of targets:**
On the basis of third party assessments after the initial period.

For other potential applications such as PVC cables, flooring and roofing membranes, more work is needed in developing suitable logistics, technologies and reuse applications. The PVC industry is committed to supporting these developments in order to achieve higher mechanical recycling targets as soon as possible.

The PVC industry commits to develop the use of high-quality mechanically recycled PVC in new products. It is important to bear in mind that the PVC industry has already developed a systematic take back scheme for production waste and will develop similar schemes for installation and transformation waste.

**b) Feedstock recycling**

This is a new technique developed for the recycling of ‘PVC rich’ plastic waste, such as PVC coated fabrics, automotive interior trim, cable harnesses and other composite structures. PVC producers commit to invest 3 million euro by 2001 in a pilot plant, with the objective to recover the chlorine and hydrocarbons. Depending on the outcome (expected for middle of 2002) a decision on the building of a commercial scale plant will be made.

Other potential feedstock recycling processes will be investigated in parallel by the PVC industry. It is assumed, that by the year 2005, feedstock recycling will make a substantial contribution to the treatment of PVC rich plastic waste.

Together with the development of additional mechanical recycling and feedstock schemes it is anticipated that the total recycled will reach up to 200,000 tons PVC waste in 2010 (excluding industrial waste). For this recycling volume to be reached there is a need for support from public authorities to create and organise appropriate waste collection schemes.

The PVC industry will work with all the stakeholders in order to develop the recycling schemes.
2.3.2 Municipal solid waste incineration and other recovery processes

Municipal solid waste incineration (MSWI) will play an increasingly important role in sustainable waste management concepts. PVC present in the waste stream contributes to energy recovery.

Salt residues are by-products of some MSWI technologies. Only part of these residues are due to PVC waste.

The PVC industry commits:

- to support technology developments in order to minimise the quantities of salt residues produced;
- to develop purification technologies, with the objective to recover the salt to be reused in chemical processes, and minimise the final residues to be disposed.

Based on the concept of sustainable development and eco-efficiency of recovery, the industry will put its expertise to work to promote and support the development of energy recovery.
The Management and Financial Scheme

3.1 Rationale for a financial commitment

Sufficient investment is important to underpin the PVC industry’s commitments. For this reason, the PVC industry will provide a meaningful level of resources to support the Voluntary Commitment.

3.2 Management

A Management Committee, will be created to manage the process described in the Voluntary Commitment.

A rolling three-year framework programme will be proposed by the Management Committee, and approved by the individual associations, describing the projects selected in order to meet the industry commitments as set out in section 2 of this Voluntary Commitment (with the exclusion of the existing feedstock recycling pilot plant).

3.3 Financing of Projects

ECVM, ECPI, ESPA and EuPC member companies will provide, directly and indirectly, the amounts necessary to achieve the specific projects agreed upon.

The total amount contributed through the associations will be defined by the agreed projects, with the understanding that the total financial contributions may reach up to 25 million euro per year.
Voluntary Commitment of the PVC industry

This document, describing the PVC industry’s voluntary commitments to improve sustainability, will be signed and approved by the appropriate representatives of ECVM, ECPI, ESPA and EuPC.

It is provisionally approved by the four organisations, and is signed by:

David Rolph on behalf of Robert Bornhofen, Chairman of ECVM

Jerker Olsson, Chairman of ECPI

Michael Rosenthal, Chairman of ESPA

Victor Dierinckx, Chairman of EuPC

Brussels, 7 March 2000. (Signed in four copies)
Appendix 1: Definition of terms

Additives
Materials which are blended with polymers to make them easy to process, give the physical properties required in the end-application and protect them from the effects of time and weather. Additives include mainly stabilisers and plasticisers.

Best Available Techniques (BAT)
Under the EU Integrated Pollution Prevention and Control Directive BAT is defined as “the latest stage in development of activities, processes and their methods of operation which indicate the practical suitability of particular techniques as the basis of emission limit values for preventing, or where not practicable, minimising emissions to the environment as a whole, without predetermining any specific technology or other techniques.”

Eco-efficiency
A concept developed by the World Business Council for Sustainable Development (WBCSD) encouraging businesses to become more competitive, more innovative and more environmentally responsible. Eco-efficiency is based on the similar idea that business must be ‘ecologically and economically efficient’ by ‘doing more with less’. Eco-efficiency performance indicators: (1) reduction of material intensity, (2) reduction in energy intensity, (3) reduction of toxic dispersion, (4) enhancement of material recyclability, (5) use of renewable resources, (6) extension of product durability, (7) increase of service intensity.

Emulsion PVC
Emulsion PVC (E-PVC) is produced using water, vinyl chloride monomer and an initiator soluble in water. Emulsion PVC applications are mostly plastisols and calendaring, profiles, flooring, wallcovering, coated fabrics and sealants. Microsuspension is a variation of the emulsion process.

Feedstock recycling
Feedstock recycling is a form of material recycling, particularly well suited to mixed plastics waste. These technologies, many under development today, break the plastics down into their chemical constituents. These can be used as building blocks for a wide range of new industrial intermediate and consumer products. In effect, the plastics are reprocessed at the place of origin, the petrochemical complex. This can be compared to paper recycling whereby the waste paper is converted back to pulp for reprocessing into new products.

Plasticiser
These are organic compounds, sometimes mixed with polymers to make a more flexible plastic. The commonest plasticisers are the phthalates, adipates and citrates.

Polymer
An organic material composed of long chain molecules made up of many monomer units. Most plastics have a chain backbone of carbon atoms. Polymers are almost always blended with additives before use. Plastics = polymers + additives.
Responsible Care®
Responsible Care® is the world-wide chemical industry’s commitment to continual improvement in all aspects of health, safety and environment performance and to openness in communication about its activities and achievements. National chemical industry associations are responsible for the detailed implementation of Responsible Care® in their countries.

Stabiliser
Any substance which tends to keep a compound, mixture or solution such as a polymer from degradation or from changing its form or chemical nature. Stabilisers act to preserve the chemical equilibrium such as anti-oxidants.

Suspension PVC
Suspension PVC (S-PVC) is produced using water, vinyl chloride and an initiator that is soluble in the monomer. The main applications for this type of PVC are pipes, cables, rigid profiles, building application and injection molding.

Thermoplastic
A polymer that softens when exposed to heat (the temperature depends on the type of plastic) and returns to its original condition when cooled to room temperature.

Vinyl Chloride Monomer
Vinyl Chloride Monomer (VCM) is the monomer building block for the production of the PVC polymer.
Appendix 2: Characteristics of PVC

- Its lightweight nature brings energy savings in applications such as packaging and transportation. Lighter cars mean lower fuel consumption; lighter packaging saves fuel in distribution, etc.

- Its durability means that in some applications service life in excess of 100 years can be expected, despite exposure to sun, heat, fire and chemicals. Long life products mean low maintenance and highly efficient use of resources.

- Its unique range of properties opens the door to innovation, which brings to society advances in a wide range of applications from healthcare, construction techniques to the design of everyday products.

- It provides some 530,000 jobs in Europe most of which are in the converting industry in small and medium sized enterprises.

- Products made from PVC have an extensive record of safe use. This ‘tried and tested’ background, coupled with an excellent balance of cost and performance continues to make PVC a success around the world.
Appendix 3: Contact details

If you would like more information on the PVC Industry Voluntary Commitment or any of the issues raised within this document, please contact any of the organisations listed below:

**The European Council of Vinyl Manufacturers (ECVM)**
Represents the European PVC producing companies and is a division of the Association of Plastic Manufacturers in Europe (APME). Its membership includes the 10 leading European PVC producers which together account for over 95 per cent of Europe’s production of PVC resin.

Avenue E van Nieuwenhuyse 4
B-1160 Brussels
Tel: + 32 2 676 74 43
Fax: + 32 2 676 74 47
www.ecvm.org

**The European Stabilisers Producers Associations (ESPA)**
ESPA represents the whole of the European stabilisers industry through its five branches:
- European Cadmium Stabilisers Association (ECADSA)
- European Lead Stabilisers Association (ELSA)
- European Tin Stabilisers Association (ETINSA)
- European Mixed Metal Solid Stabilisers Association (EMMSSA)
- European Liquid Stabilisers Association (ELISA)

Avenue E van Nieuwenhuyse 4
B-1160 Brussels
Tel: + 32 2 676 72 86
Fax: + 31 2 676 73 01

**The European Council for Plasticisers and Intermediates (ECPI)**
ECPI represents the interests of 26 member companies that are involved in the production of plasticisers. Plasticisers are esters (mainly phthalates) which are used generally in the production of flexible plastic products, predominantly PVC.

Avenue E van Nieuwenhuyse 4
B-1160 Brussels
Tel: + 32 2 676 72 60
Fax: + 32 2 676 73 01
www.ecpi.org

**European Plastics Converters (EuPC)**
EuPC represents approximately 30,000, predominantly medium-sized, plastic processing operations in Europe. These companies have over one million people on their payrolls, 85% of whom work for companies that employ less than 100 people. The individual members combine to produce a processing capacity of more than 30 million tonnes of plastic every year.

Avenue de Cortenbergh 66
Bte 4
B-1040 Bruxelles
Tel: + 32 2 732 41 24
Fax: + 32 2 732 42 18
www.eupec.org