



PVC

## **A LITTLE PVC GOES A LONG WAY**

The PVC cost advantage  
in construction



## What is PVC?

PVC (polyvinyl chloride), also known as vinyl, is a versatile type of plastic, composed of 57% chlorine and 43% carbon. PVC is generally produced in powder form and then blended with additives to create a vast range of flexible and rigid PVC end products.

## Characteristics

Among its attributes, PVC is durable, fire and corrosion resistant, easy to process, and recyclable.

## Where is PVC used?

PVC's amazing properties make it the material of choice for many uses in our homes, at work, and in our cars. From pipes, floors and windows to packaging, electric cables, medical devices and textiles, PVC enhances our lives and makes them safer.

## New research study

Early in 2011, the European Council of Vinyl Manufacturers commissioned an independent company<sup>1</sup> to analyse the comparative cost of PVC in the construction industry. The study focuses on window profiles, pipes and flooring in Germany and Italy, judged to be a fair representation of conditions in north and south European countries.

Combining published data and field investigation, the study is based on an analysis of the **total cost of ownership of PVC** compared to the most popular alternative materials.

## Why Total Cost of Ownership?

TCO takes into account all costs associated with a product over its entire life cycle. It is a "customer centric" analysis which reveals the difference between the purchase price of a product and its true lifetime cost.



Buy

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Install

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Use

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Maintain

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Repair

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Replace

(1) "PVC product competitiveness, a total cost of ownership approach", Althesys Strategic Consultants, 2011.

(2) PVC window profiles have a 57% share of market in Germany, and an 18% share in Italy.

## Window profiles

Windows play a vital role in reducing building energy loss and saving heating or cooling costs. This research compares the total cost of ownership of windows with PVC profiles<sup>2</sup> with the two most popular alternatives: wood and aluminium.

All analyses are based on windows with good thermal performance ( $U_w$ :  $1.3\text{W/m}^2\text{K}$ ) over a 30-year life in domestic housing. The main conclusions are:



### 1. PVC windows are much less expensive to buy than wood or aluminium, and cost much less to maintain than wood.

- purchase and installation of PVC costs up to 41% less than aluminium and up to 36% less than wood;
- PVC frames never require stripping and painting, just occasional cleaning and lubrication of seals.

### 2. PVC windows provide big net savings and pay back their investment much faster than wood or aluminium.

- all three types of window profiles produce net savings over 30 years (i.e. energy savings exceed costs);
- but PVC pays back the total investment in only 8 years in Germany (wood 9 years, aluminium 14 years) and 12 years in Italy (wood and aluminium 24 years);
- discounted cash flow analysis also shows that government fiscal incentives are an effective tool in improving economic return and further reducing payback periods, although PVC remains the most cost competitive option.

### 3. The higher the energy consumption, the more PVC saves.

- higher energy consumption leads to higher savings over time (one of the reasons why the German payback period is shorter than in Italy).

## Outdoor pipes

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The study looks at drinking water pipes, which are generally made of plastics such as PVC or ferrous metals, and sewage pipes which mainly consist of plastics or concrete.

In this case, final users are utility companies which are responsible for all steps in the piping lifespan. Because of the variety of materials and pipe diameters used, this study analyses the costs both for 50- and 100-year product lifetimes.

### **1. Both the purchase cost and total cost of ownership of PVC is significantly lower than iron and cement.**

- this applies to both drinking water and waste water networks in Germany and Italy;
- the diameter of the piping does not change the ranking, although PVC's comparative advantage versus iron and cement decreases with diameter size.

### **2. The major cost of pipe networks is laying the systems, and PVC can also save money here.**

- installation costs (including trenching, handling and laying) are typically between 50% and 70% of total network lifetime costs, depending on the type of material and pipe diameter;
- with its lower weight and ease of laying, PVC reduces overall installation costs for both pressure and non-pressure pipe systems.

### **3. The lower failure rate of PVC leads to lower pipe replacement costs.**

- the cost of repairs and dismantling old piping account for up to 10% of the total cost of ownership of a water network, so improvements here make an important difference;
- with its durability and extremely long life, the low failure rate of PVC can provide significant savings versus conventional concrete and iron networks.

# Flooring

The study looks at resilient floor coverings for various types of use, according to EN 685 definitions and separates the results into two categories: light to medium traffic (such as offices and shops) and heavy traffic areas (public entrances, waiting rooms, etc.). A service life of 20 years is assumed for the total cost of ownership analysis.



## 1. The cleaning and maintenance of floor coverings is by far the largest cost element.

- the heavier the traffic, the higher the proportion of cleaning and maintenance costs in the total lifetime cost (up to 92%);
- minimizing cleaning and maintenance costs should be the major purchase consideration, especially where labour costs are high.

Flooring types having the lowest purchase price are not necessarily the ones having the lowest TCO. The high end floorings have the lowest maintenance cost, and therefore the lowest total cost of ownership.

## 2. Standard PVC floors have the lowest purchase cost but not necessarily the lowest cost of ownership.

- irrespective of the type of flooring material (high-grade vinyl, rubber, PVC or linoleum), the purchase price represents less than 20% of lifetime costs in heavy traffic areas.

## 3. Newly-developed premium PVC flooring is the most economical solution due to its low maintenance requirements.

- new PVC technologies have led to the creation of floorings with low-porosity surfaces that require minimal cleaning and maintenance, driving down the total cost of ownership;
- less cleaning also means saving water and energy resources.

## Conclusions of the study

While PVC's benefits in the areas of durability, longevity and flexibility of use are renowned in the construction industry, its cost advantages are not always understood. This comparative cost analysis shows that PVC provides decisive cost advantages, not just in its low initial purchase price but also in its low cost of ownership throughout the whole product lifespan.

The European PVC industry is confident that new proprietary technologies developed by the plastics industry – such as low-porosity floor coverings which reduce the need for cleaning – will strengthen PVC's appeal and cost advantages, now and for the foreseeable future.

### PVC in Europe: fast facts <sup>3</sup>

12 PVC RESIN PRODUCERS.

20,000 COMPANIES PROCESS PVC FOR END PRODUCTS.

7 MILLION TONS. ANNUAL PRODUCTION OF PVC PRODUCTS.

€72 BIO. TURNOVER.

5.5 MILLION TONS. ANNUAL CONSUMPTION OF RESIN.

530,000 JOBS IN THE PVC CHAIN.

(3) 2010

**Would you like to know more about PVC?**

[www.pvc.org](http://www.pvc.org) & [www.vinylplus.eu](http://www.vinylplus.eu)

**Download the brochure at:**

[www.pvcconstruct.org](http://www.pvcconstruct.org)



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