

Procurement and use of PVC

What is PVC Used For?

While PVC is widely used in short-life applications (such as packaging), some 50-60 per cent of applications are long-life. PVC products are widely used in construction projects, for example:

- pipes and ducts
- electrical cables and wiring
- flooring
- windows, doors and profiles
- roofing and cladding
- building membranes.

What is the current debate over its selection as a material?

Although the use of PVC is not prohibited by legislation, concerns over adverse environmental impact are causing some customers to limit its use. See Supporting Document 1: Arguments for and against the use of PVC.

Carillion Guidance

1. There are alternatives, including plastics, to most PVC products used in construction but these also have varying degrees of environmental impact and cost implications.
2. It is important that environmental risk assessment is carried out where PVC products are being considered and that alternative, lower impact materials are used wherever practicable. See Supporting Document 2: Questions to ask when purchasing material.
3. When clients specify PVC products, Carillion should bring environmental concerns to their notice and suggest alternatives. Some alternative products include:
 - **drainage** - stainless steel, iron, copper, aluminum, HDPE and clay
 - **cladding and profiles** - FSC certified timber, strand board and rockwool
 - **windows and doors** - FSC certified timber and aluminum
 - **flooring** - cork and linoleum
 - **electrical cables and wiring, trunking and channeling** - PVC-free cable alternatives, such as Zero halogen, low smoke cabling (OHLS), and steel
 - **building membranes** - stressed fabrics, EDPM, rubber and butyl geomembranes.

4. Where PVC products are to be used, the supplier selection should include an evaluation of environmental commitment and performance (see Supporting Document 2 for questions relating to PVC suppliers), and all relevant safety precautions must be taken during installation.

Supporting Document 1: Arguments for and against the use of PVC

For	
Resource Consumption	Because 57% of the basic PVC molecule is chlorine, only 8 tonnes of oil are needed for each tonne of PVC polymer, in comparison with polyethylene which requires 18.7 tonnes. Chlorine is produced by the electrolysis of a saline solution. Given salt is not a scarce resource PVC has a resource consumption advantage over other polymers
Energy content of the polymer	Life cycle analysis has been carried out by the Association of Plastic Manufactures into the energy content of various polymers. Some data is summarised below: PVC 53 (MJ/kg) PE 69 (MJ/kg) PET 84 (MJ/kg)
A versatile product	The plastic is relatively cheap, lightweight, strong and adaptable to many applications. Its light weight and its thermal properties are beneficial in buildings, and the wide use of PVC in irrigation and roofing benefits users in the developing world. PVC is also the best material so far discovered for many medical applications.
Recycling potential	As a thermoplastic PVC can be recycled many times without substantial loss of integrity and structure. However, there are currently substantial difficulties in implementing effective collection and sorting. PVC (due to its chlorine atom) can be automatically identified by using X-ray fluorescence and thus separated from the waste stream. However, the gap between theory and practice is huge.

Against	
Persistence in the environment	PVC contains chlorinated hydrocarbon compounds which do not break down naturally and may bio-accumulate, it is argued that alternatives are available, such as polypropylene.
Toxicity of components	<p>Chlorine gas is toxic (but once it is part of the PVC molecule it becomes an inert component).</p> <p>The health effects of PVC polymer dust remain a matter for controversy. It has been suggested that very fine, respirable dust might cause the miners' disease, pneumoconiosis.</p> <p>There is also concern regarding the heavy metal stabilizers used with the polymer. The regulations concerning sensitive applications of plastics forbid their use but there long-life applications of PVC where they are still the additive of choice</p>
Negative perception	Issues of perception, whether based on science or not, are very relevant for corporate clients wanting to protect their own reputation.
Downstream implications of chlorinated wastes	There is debate as to the likelihood of dioxins and other organochlorine substances being the problematic result of emissions from waste incineration. Whatever the scientific balance of risk this is likely to be significant concern amongst the public until better measures exist to facilitate the reuse of PVC and the recovery of chlorinated compounds from controlled incineration
Use of refrigerant and fire fighting chemicals in the manufacturing process	Many such chemicals are ozone-depleting
Worries over use of phthalates as a plasticiser	There are worries (which are hotly disputed) that phthalates can disrupt hormone systems. But the compounds do readily biodegrade under aerobic conditions and do not tend to accumulate in food chains

Supporting Document 2

Questions to ask when purchasing any material:

1. Do we need to buy this product?
2. Can we use a lower specification brand?
3. Does the material contain re-used or recycled materials?
4. Which product is cheapest over its whole life?
5. Does the product contain chemicals requiring Safety Data Sheets?
6. Can the product be re-used or recycled once obsolete?
7. Will the product require special disposal arrangements?

Questions to ask when thinking of selecting a material containing PVC

1. Is there a potential for recycling waste PVC products, does our PVC supplier help with this?
2. Is the PVC supplier looking to (or participating in industry initiatives) to reformulate the PVC to facilitate recyclability? Are they looking at (or participating in industry initiatives) to phase out additives that can accumulate in nature or where there is doubt regarding toxic effects?
3. Does the PVC supplier participate in schemes to educate users in the retail and construction sectors to promote sorting and recycling, and to learn from examples of best practice in other countries?
4. It is important to consider the life-cycle sustainability of PVC on a specific application-by-application basis. For how long will the PVC material be in use? The main worries regarding PVC are in its manufacture and disposal which are a more significant percentage of its life cycle costs the shorter the in-use life of the product.
5. Is the PVC manufacturing plant, whether it is located, run with the same standards for worker welfare and environmental performance as would be required in the UK
6. How will the PVC product be disposed? Will there be adequate controls to ensure persistent organic compounds are not released into the environment?