

New Lease of Life for Old PVC

Ever since PVC took off in the 1960s as an alternative to kiln-fire and concrete materials, Australian pipe and fittings manufacturers have re-used their off-cuts (known as 'regrind') to make non-pressure products for stormwater and drainage applications.

Three decades on, efforts to minimise wastage and reduce processing costs continue apace. PVC has permeated the plumbing sector to such an extent that scrap material has become an important component in manufacturers' search for market advantage – and in honouring environmental commitments.

Recycling has allowed companies to create budget stormwater products, while others are using recycled product to reduce the production costs of DWV (drains, waste and vent) pipes and fittings. Larger-scale manufacturers are using recycled PVC products in co-extruded foam-core and solid-wall sandwich construction pipes.

Product performance that matches that of pipes made from virgin material, off-cuts from various industries being diverted from landfill, decommissioned pipes being unearthed and re-used ... it all sounds too good to be true. And, in a sense, it is.

For some, the costs and complications that come with using recycled PVC create a disincentive. But, for those companies that need the material, getting it diverted from rubbish tips or overseas contracts is a significant challenge.

"The industry has demonstrated its capacity to rework appropriate recycle," says Plastics Industry Pipe Association (PIPA) chief executive, David Sumner.

"To date, this has been sources from the industry's own rework, from exhumed redundant pipelines, from other manufacturers' scrap (such as profile extruders), from plumbing off-cuts at major construction sites and from packaging waste."

Rescuing Scrap from On-Site

To help sate the industry's appetite for recycled material – an appetite created in part due to PVC having remained in active service for decades – construction companies are being urged to form alliances with pipe-makers that can re-use the rigid PVC off-cuts used in building materials.

The Vinyl Council of Australia's communications and environmental affairs manager, Laurie David, says that a recent NSW pilot project involving the Mirvac Group has shown how builders using large quantities of clean PVC stand to benefit from segregating these off-cuts from other rubbish.

"Being able to divert it into the hands of someone who can use it is far better for the environment and it's going to be far more cost-effective for construction companies that can reduce costs involved in land-filling," she says.

"This is a recoverable resource, and if the building sector understood that better and made a priority of separating it out, they'd find willing and receptive takers."

Now a model for wider-scale initiatives, the aim of the Mirvac trial was to minimise disruption on-site, with the regular waste contractor fulfilling its normal duties but directing the PVC off-cuts to pipe factories rather than the tip. The main hurdle with the trial related to quantities involved.

“Admittedly, there isn’t a large volume of material to come from one site,” Laurie says. “But if every major building project was sorting out PVC, pipe manufacturers would have an increased supply they could rely on.”

Bottle Barriers

Plastic bottles collected from kerbsides and milled in a cryogenic grinding process are another PVC source for plumbing product manufacturers, who blend it with virgin material for non-pressure applications. But, again, the trouble lies in getting enough material.

“Demand from pipe manufacturers has been growing,” says Cryog grind chief executive, Basil Siganakis, who runs Australia’s principal PVC bottle recycling facility on behalf of the Australian Vinyl bottle industry. “But supply of PVC to us hasn’t been growing much at all.”

Basil says the problem stems from local government authorities failing to ensure that sorting contractors place enough emphasis on PVC compared to more prevalent plastic like the PET found in soft-drink bottles.

“With PVC, it’s often a case of what’s left on the line – and in a lot of cases people just don’t bother to separate it out. And that means we don’t get it.”

Of the material that is collected, most is exported to China, where lower labour costs enable further hand-sorting before the recyclate is typically processed into – you guessed it – stormwater pipe.

Substitute for PVC Original

No matter where the waste PVC originates, the pipe and fittings producers tend to use it as a direct substitute for virgin material, combining it with additives like stabilisers and plasticisers to make the product in the conventional manner according to Australian standards.

As one would expect, the waste material is less expensive than virgin, but additional steps that may be required during processing can negate the original savings.

This often depends on how much trouble a pipe-maker is prepared to take. As Tech Plas Extrusions sales manager Rex Martin explains, smaller manufacturers with limited resources are often unable to perform tasks such as sorting their waste to ensure the colour is similar to virgin pipes.

“Our business is so small that we can’t always hope to sort when we granulate, so when we put it into the machine to make pipe, it comes out in various colours,” says Rex. “Our product is made for burying.”

While Tech Plas uses 100% recyclate to produce a cost-effective product for the competitive stormwater market, other producers, such as fittings maker Independent Plastics, blend bottle recyclate with virgin material to achieve the desired result.

“We add recyclate to virgin PVC at a rate of about 30% to manufacture stormwater fittings and other non-standard products,” say Independent Plastics managing director Wayne Tibbets.

“The waste is still good material because it’s reconstituted – it adds back some of the physical properties that get burnt out in the first moulding – and it does reduce the cost to some degree.

“The only thing that makes it obvious that it’s recycled is the fact that it’s not a uniform colour.”

Bigger Dimensions

For bigger manufacturers like Vinidex, recycled PVC is being used in more sophisticated applications such as foam-core pipes comprising a solid inner and outer wall made from virgin PVC and a thicker layer of recycled material in between.

To keep abreast of such advances, pipe stiffness has overtaken wall thickness as a critical design consideration in the Australian Standard 1260 for DWV pipe at, or above, 100mm diameter.

“The primary design aspect of interest is the pipe’s stiffness, or its ability to resist collapse under soil-loading conditions,” says Vinidex technical services group manager, George Macovaz.

“So the Standard has been rewritten to enable some flexibility with the wall thickness of the pipe, while still fulfilling the performance requirements.

“What that means is we can use materials that might not be as stiff – you could have material varying in specification because it’s recycled – and we can then increase the wall thickness to compensate.

“We’re only talking about small variations, but in the end, we still have a product that conforms to all the requirements and is fine for the application.”

The Right Approach

Some plastics pipe manufacturers would prefer we didn’t report on waste material being used in PVC plumbing products because of the possible negative perceptions about the use of recycle.

Most, however, believe that their environmental work deserves recognition in the community – and more than a few are receptive to the suggestion that labelling certain plumbing products ‘recycled’ could create a lucrative niche.

Several pipe-makers have also become signatories to the Vinyl Council’s Product Stewardship Commitment, which is endorsed by the Federal Government through Environment Australia and addresses issues such as impediments to recycling.

“We’re not being driven purely by economics; we’re driven by sensible use with due consideration to environmental issues,” says George Macovaz.

“We’re taking a broader view of our responsibilities with respect to product as opposed to just making something and just making a profit. And I think the industry generally is taking that sort of view.”

AUTHORS

Plastics Industry Pipe Association of Australia (PIPA)
www.pipa.com.au [link to PIPA website]

Vinyl Council of Australia
www.vinyl.org.au [link to Vinyl Council website]