Technical Bulletin

halgan pty ltd

RECYCLING OF POLYETHYLENE

Suitable for non-structural products

Today approximately 95% of the material used in rotational moulding is polyethylene (Linear Low Density Polyethylene (LLDPE), Medium Density Polyethylene (MDPE) and High Density Polyethylene (HDPE)).

Polyethylene is used widely in rotational moulding because it has excellent chemical resistance, very high stiffness and good processability. One of the advantages of rotationally moulded polyethylene is that the products made using this process typically have a very long service life. They are relatively thick and strong compared to other products made with different plastic processes, which tend to have relatively short term or medium term service life. Polyethylene is non-biodegradable and can take centuries to decompose, so it is important that products made of Polyethylene are recycled and used again.

Advantages of recycling polyethylene

Rotomoulded polyethylene products can easily be recycled, and in Australia demand for recycled rotomoulded exceeds supply. However, where you can use recycled material depends on the type of end product and how demanding the application is. Recycling of plastic poses several concerns to manufacturers. The most important concern is the unpredictability of their mechanical properties (modulus of elasticity, tensile strength and ductility).

Recycled rotomoulded polyethylene recovered after use will often not have the required characteristics for reuse in the same application, i.e. as an above ground storage tank, or an underground storage tank. The mechanical properties of recycled material are not as consistent as virgin material. It is well known that recycled material must only be used for non-structural products. However, there are many applications that take advantage of this recycled material, including small telecommunication pits, planter pots and cattle troughs.

Incorrect recycling

Premature failure in structural products, like underground storage tanks or above ground chemical storage tanks, comes at a substantial cost. The reputation of the distributor and manufacturer is questioned, often resulting in immediate loss of customer satisfaction and future business. The leaking of the liquid from a failed tank serves as a liable environmental hazard that jeopardizes the safety and welfare of its surroundings – people and environment.

Consumer Guarantee liability between distributors and manufacturers

The Chain of Responsibility around a failed tank will almost certainly involve the purchaser of the tank, the installer of the tank, the distributor that sold the tank, as well as the manufacturer or importer of the tank. The Consumer Guarantee requires the supplier (Retailer or Distributor) to take responsibility for any product defect or failure, directly with the purchaser. However, all these parties can become directly responsible for the repair or replacement of the tank or other structural product, which has the potential to become very expensive.

It is well known to all manufacturers of rotational moulding polyethylene materials that there is a reduction in performance properties due to material recycling The properties of recycled plastic recovered from material

recycling are known to differ from those of virgin plastic. Using recycled materials to manufacture structural products creates significant risk for all parties, which is why no raw material supplier in Australia recommends recycled materials be used in underground storage tanks or above ground storage tanks.

Recycling recommended for non-critical application

Material suppliers will recommend that recycled polyethylene must not be used for critical applications or for products that require long performance warranties, and of course, recycled materials must not be used in any applications that come into contact with food or drinking water.

Recycled rotational moulding materials used in non-structural applications still require careful processing by raw material manufacturers. This is because rotomoulding applies more heat, oxygen and molding time than other plastic processes, and therefore these polyethylene resins must contain more heat stabilizers than, for example, injection and blow molding resins.

Standards

AS/NZS1546 Septic & Holding Tanks

Manufacturers of septic tanks and holding tanks should comply with AS/NZS1546. This standard requires qualified engineer to use structural design methodologies and standards that will guarantee long term service durability.

Suppliers of polyethylene materials used to manufacture tanks in compliance with AS/NZS1546 must provide written evidence of approvals or tests that the materials will achieve the ultimate durability requirement of not less than 15 years service.

Australian suppliers of rotational moulding raw materials will not recommend the use of recycled material for the manufacture of underground storage tanks because the performance of recycled polyethylene will have variable and unknown performance. Suppliers of recycled polyethylene cannot provide qualified engineers with long term material performance properties to enable necessary long term calculations and predictions for the rotomoulded product. This is why recycled materials in Australia are used in non-critical applications like planter pots or storage bins.

AS/NZS4766 Chemical & Water Tanks & Recycling

Manufacturers of rotational moulded above ground chemical and water tanks in Australian should comply with AS/NZS4766. This standard specifically does not allow recycled polyethylene to be used. Chemical and water tanks must have guaranteed long term performance.

Recycled rotomoulded tanks are recovered into other non-structural applications, like small telecommunication pits, planter pots and cattle troughs.

AS/NZS4130 HDPE Pressure Pipe & Recycling

Manufacturers of PE100 polyethylene pipe in Australia should comply to AS/NZS4130. This standard does not allow recycled polyethylene to be used. PE100 pressure pipe is a structural product that must have guaranteed long term performance.

Recycled polyethylene pipe, recovered after use will not have the required characteristics for reuse as PE pressure pipe. It can be recycled into other plastics products that are less mechanically demanding, for example, corrugated Ag Pipe which is used in general drainage situations.