

Recycling Waste Polystyrene to Save Money and Help the Environment.

Polystyrene has many uses as a packaging material but disposing of or recycling this material can be problematic and expensive. Purex International think their new Styromelt™ thermal densifier can save money and help the environment.

Uses of EPS

Expanded polystyrene (or EPS) is used everyday by just about everyone in some shape or form. It is used mainly as a packaging material because of its impact resistance, ability to be shaped and its thermal insulating properties which make it ideal to protect thousands of different products including:

- Fish and meat.
- Electronic goods such as TVs, computers and monitors.
- Fridges, freezers and cookers.
- Small products (Loose fill EPS chips).
- Flat pack furniture
- Machines and parts
- and electronic components.

EPS is produced in thousands of different forms for specific packaging requirements and is also used to make products such as disposable cups, trays, cutlery, cartons, CD cases and containers.

Disposal Methods

It is conservatively estimated that well over 300,000 tons of waste EPS are produced on an annual basis in the UK. In the USA according to the EPA over 377,579 tons of Polystyrene are produced in California alone.

The question is, what happens to all this packaging once the goods it protects have been delivered? Although some companies have a recycling policy for this material if they use large amounts, unfortunately, most EPS will find its way into landfill sites around the world.

Because EPS is so light, the volume of landfill space it takes up compared to its weight is considerable. To put this in perspective 300,000 tons equates to approximately 37.5 million cubic metres or enough to fill 15,000 Olympic sized swimming pools each year!

Most household EPS is simply put in the bin and dumped into landfill which is a real environmental problem as the cost of landfill is growing while the availability is fast diminishing. Anyone who has unpacked a cooker or Plasma TV will know how large the protective packaging can be and therefore how much volume of landfill space it would take.

In industry, many companies simply place their waste EPS in hire skips which are collected by waste disposal companies. This has several drawbacks.

Manufactures, retailers, supermarkets, fish merchants, education establishments, sports stadiums, cruise/ferry ships and hospitals (amongst others) may find that a significant volume of their waste skip by volume is filled with EPS. Depending on the size of the skip they use and the frequency of collection, the cost of hire can be hundreds or thousands of pounds per week. As EPS is over 90% air it means that the company which hires the skip is paying to dispose of mainly fresh air!

Once waste EPS is put into a mixed skip it may be contaminated by other materials which makes recycling difficult or impossible. In the case of fish merchants and supermarkets the EPS boxes they use will be contaminated with organic waste such as water and blood which may make it even more difficult to dispose of.

After collection the waste EPS usually ends up in landfill sites where it occupies a significant volume of space and because of its lack of weight it can be blown around and cause a nuisance in the surrounding area.

Landfill is fast becoming more and more expensive and scarce plus, government plans to fine local authorities for not hitting recycling and landfill diversion targets make sending EPS to landfill potentially even more expensive.

Solutions

This material is not generally a high profile target in recycling terms unlike glass, paper, aluminium cans, batteries, tyres and the like. Many companies and local authorities may not have considered the implications of just how much EPS they are dumping. So what is the solution? The answer is separation, compaction and recycling.

Separation

One of the first things a company or local authority recycling centre can do is to take note of just how much waste EPS they produce. Running a trial of separating EPS before it goes into a skip may show just how much could be potentially recycled.

Compaction

EPS is compacted to reduce the amount of space needed for storage and also to reduce transport costs. The historical method of EPS compaction is by mechanical means. The EPS is pushed through a compactor to reduce its volume by around half, it is then formed into blocks and stored.

The main drawbacks of this method are that it only compacts EPS by around 50%, it can also create lots of noise and dust, a full time operator is usually required to feed the compactor and foreign objects introduced in error (or deliberately) can damage the machine itself leading to expensive repair costs and downtime. Contaminated EPS such as fish boxes cannot be compacted in this way due to health and safety reasons as blood and other organic matter will be present. Storage of boxes contaminated in this way can

also be a problem as they take up significant space, can create an odour problem and attract vermin.

The new alternative to mechanical compaction is the Styromelt 'Thermal Compaction and Densification System' from Purex International.

Using these systems is simplicity itself. The machine has a loading area of two cubic metres which is filled with EPS, the door is then closed and locked and the machine switched on. Two temperature controlled thermal plates then heat the EPS to melting point where it releases all the air and other gases it contains forming a dense resin which is collected in a tray where it cools. Once cool, the resin block is removed from the tray and stored for recycling.

The most astonishing thing about this process is that the EPS is reduced by up to 95% of its original volume and the resin block is completely sterilised so it can be stored indefinitely, easily handled or transported without a problem.

Fumes from the process are passed through a filter system and the machine is IP56 rated and manufactured from stainless steel so it can be situated outdoors.

Recycling

Reducing the amount of landfill space EPS takes by up to 95% would be reason enough to thermally compact and densify this material.

But EPS holds a few recycling secrets.

This material can be recycled into a myriad of new products. The thermally condensed blocks can be turned into coat hangers, picture frames, replacement hardwood, disposable cameras and CD cases to name but a few. There is also an emerging market for EPS blocks for the production of fuels such as green diesel and LPG.

The thermally compacted blocks can also be sold to a variety of outlets for incineration (or energy recovery). The reason for this demand is that incineration of polystyrene generates large quantities of usable energy - approximately 16,000 BTUs/pound, which is twice that of coal!

Alternatively organisations who produce thermally compacted blocks can also take advantage of a service to collect the material in the UK free of charge subject to volume agreements.

Summary

It is a fact that as a society we produce too much waste. Landfill sites are becoming increasingly full and cannot last forever. Therefore any method of taking a product from cradle to grave and recycling it has to be more than welcome.

According to Purex, the beauty of the Styromelt™ Thermal Compactor is that, not only does it remove significant amounts waste EPS from the transport and waste management system altogether thereby reducing landfill and environmental impact, it can also help turn this material into new products and materials or generate new fuels and energy.

For further information visit <http://www.styromelt.com> for a free site survey and consultation.

Ends.

Examples of the cost savings achievable by the Styromelt™ system are shown below...

Fish Merchant

A UK fish merchant was hiring 8 skips per week to remove mixed waste including polystyrene to landfill at a cost of £170 per skip. Total cost per week was £1,360 or £16,320 per year

A Styromelt™ system was installed at the merchants to densify the polystyrene waste instead of sending it to landfill. The cost savings turned out to be very significant. By separating the polystyrene the merchant needed only one skip per week for the rest of the mixed waste.

The remaining polystyrene was densified using the Styromelt™ with a running cost of approx 48p per hour or £76 per month to produce around 1 ton of completely sterile, easily stored product each month.

The merchant then sold this product for £100 to a recycler so they actually made a small profit on the running costs of the Styromelt™ machine. The merchant now saves approx £1,190 per month or £14,280 a year thanks to Styromelt™ and the machine has more than paid for itself in a short period of time.

French Merchant

A merchant in France was spending €2,000 per month or €24,000 a year for the local council to collect tubs of polystyrene waste from their premises. This cost to the company has been removed by installing a Styromelt™ system to densify and sterilise their waste polystyrene. They now plan to sell the densified product to a local recycling company.

Packaging Company

A packaging company in the UK was producing 8 tons of waste cardboard which it intended to sell to a local recycling company. The recycling company refused the waste because it had polystyrene trays mixed in with it.

The packaging company installed a Styromelt™ system and sorted their waste into two types. The cardboard was sold to the recyclers and the polystyrene was densified in order to be sold as well.

Agricultural Waste

A huge pile of used horticultural EPS packaging that was contaminated with soil, ivy and slugs and had been left untouched for at least ten years gave us the opportunity to test the Styromelt™ with some very challenging material. The thermal densifier does not crush or shred the material; it uses a thermal process so contaminants like food or soil do not damage the machine.

Styropak of Aberdare

Styropak is a leading manufacturer of polystyrene and has been using a Styromelt machine for several years to thermally compact polystyrene dust.

Plant Manager Wayne Davies explained that 'Previously Styropak bagged this waste and it was sent to landfill. Unfortunately the bags were prone to burst and this caused extensive litter pollution and the landfill sites were considering refusing to accept the material.'

The Styromelt machine completely eliminated this problem in a sound and ecological manner.

Snowdens of Cardiff

Snowdens are long established fish merchants who generate waste polystyrene fish boxes during their filleting and repackaging activities. A Styromelt machine was installed and reduced the volume of material being sent to landfill from 7 skips to only one a week!

Litepac of Longford Eire

Litepac, who is part of the Quinn Industries Group installed a Styromelt machine to deal with waste polystyrene generated during manufacturing. Previously this waste was transported in "Octabins" to landfill and one lorry load a week was generated.

Installation of the Styromelt System reduced this traffic from fifty two lorries a year to only one! This achieved both an environmental improvement to existing practices but also a rapid payback.

LG Electronics (UK) Ltd

LG was transporting 180 "roll on roll off" (Rollo - 30ft container skips) of polystyrene and polypropylene waste to landfill a month.

Installation of a bespoke Styromelt machine reduced this volume to only 20 skips a month relating to a payback for the machine of only 4 months!

La Villette of Paris

La Villette is a leading fish merchant and was spending 2000 Euros a month to dispose of Euro bins containing polystyrene fishboxes.

Installation of a Styromelt machine reduced this cost by two thirds and reduced the inconvenience of daily collection to a collection of only once a month! In all of the above instances, the Styromelt system produced a dust free densified briquette suitable for recycling.

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