

INTOUCH[®]

INFORMATION ON

FLEXIBLE POLYURETHANE FOAM

INTOUCH is a regular publication of the Polyurethane Foam Association. It covers topics of interest to users of flexible polyurethane foam and is designed as a quick reference for background information on key issues. To get more detailed information about a particular topic, consult a PFA member.

Efficient Solid Waste Management

The opportunity to generate additional revenues while eliminating costly waste removal has caught the attention of many home furnishings manufacturers, foam fabricators, carpet installers and other converts of flexible polyurethane foam. An easy product to recycle, flexible polyurethane foam scrap is now generating revenue for many end-users.

The flexible polyurethane foam industry has made great strides in technology and end-use applications to address waste problems. By providing a "snapshot" of the opportunities for recycling in 1994, this bulletin is intended to assist manufacturers, production engineers, distributors, retailers, carpet installers, and others in the position to recover flexible polyurethane scrap. The following information examines the economic and environmental value of recovering and reusing scrap foam, with information on how your scrap can be used to generate revenue, offset raw material cost, and alleviate solid waste disposal problems.

Foam Recycling is Viable

Reduce, reuse, recycle. This is hardly a new concept, but not always an easy one to realize. Many materials are difficult to recycle. Some simply don't produce a valuable recycled material. Others are difficult to collect and transport. But, one material being recycled now, throughout the country, provides both environmental and financial benefits: flexible polyurethane foam.

A Profitable Industry in the Making

Polyurethane foam manufacturers first attacked the solid waste problem by using more efficient product formulations and

manufacturing processes to minimize the amount of process scrap. Even so, up to 30 percent of all polyurethane foam can become scrap after cutting and shaping foam in product fabrication. Without recycling, this could be a costly disposal problem for manufacturers.

With the development of practical end-uses for scrap flexible polyurethane foam, almost every piece of scrap is recyclable.

The majority of flexible foam process scrap is ground into small particle sizes and made into bonded carpet underlay (rebond). The process is so successful that demand for scrap now exceeds supply in North America. Bonded carpet underlay manufacturers currently use more than 400 million pounds of process scrap annually. Of that total, almost 300 million pounds are purchased from domestic sources, and the balance is imported. A large percentage of home furnishings manufacturers and others using flexible polyurethane foam are now converting their scrap into revenue.

Scrap Sale Reduces Material Cost

Each pound of scrap sold helps reduce the cost of foam material used in end-product manufacturing. With a ready market for manufacturing trim wastes, using flexible polyurethane foam in filling and cushioning applications makes good economic sense.

Converting Scrap Into Revenue

How can you turn your scrap into revenue? The process of recycling scrap foam into bonded carpet underlay is fairly simple. Bonded carpet underlay producers (commonly called "bonders") are easy to locate. In their search for scrap foam, some may come knocking on your door. Many foam fabricators and foam producers are also in the business of making bonded carpet cushion. So, many sellers of foam are also actively purchasing scrap. In such cases, manufacturers and other end-users may be able to arrange "buy back" agreements with their foam suppliers. The end-user may be given an account credit, or

may be paid directly for the scrap material. The Polyurethane Foam Association can also offer assistance in locating a buyer for scrap.

Preparing Scrap for Sale

There are a few guidelines that should be allowed to ease the process of foam scrap recycling. First, the foam scrap should be clean, dry and free of foreign objects. One small piece of metal can cause severe damage to scrap processing machinery and can disable a bonded carpet pad peeler.

Large amounts of scrap can be packaged using horizontal or vertical balers. Scrap can be baled as it is generated, which helps to contain the scrap within a very small area inside the manufacturing facility. Bales also help keep transportation costs down. Smaller-scale manufacturers, those who don't generate a large quantity of scrap, or those without a baler, can simply gather scrap for storage in polyurethane bags.



PURRC
PolyUrethanes Recycle & Recovery Council

The PolyUrethanes Recycle & Recovery Council (PURRC), a unit of the Polyurethane Division of The Society of the Plastics Industry, Inc., is working on methods to reduce solid waste produced by the polyurethane industry and generated from discarded polyurethane products found in durable consumer goods.

Environmental Sunshine

The recycling issue is a double-edged sword. Having the technology to recycle a material is of little value unless there is a viable market for the recycled material. The flexible polyurethane foam industry, fortunately, has developed an eager market for its recycled products. Today, bonded carpet underlay comprises the majority of all carpet cushion sales.

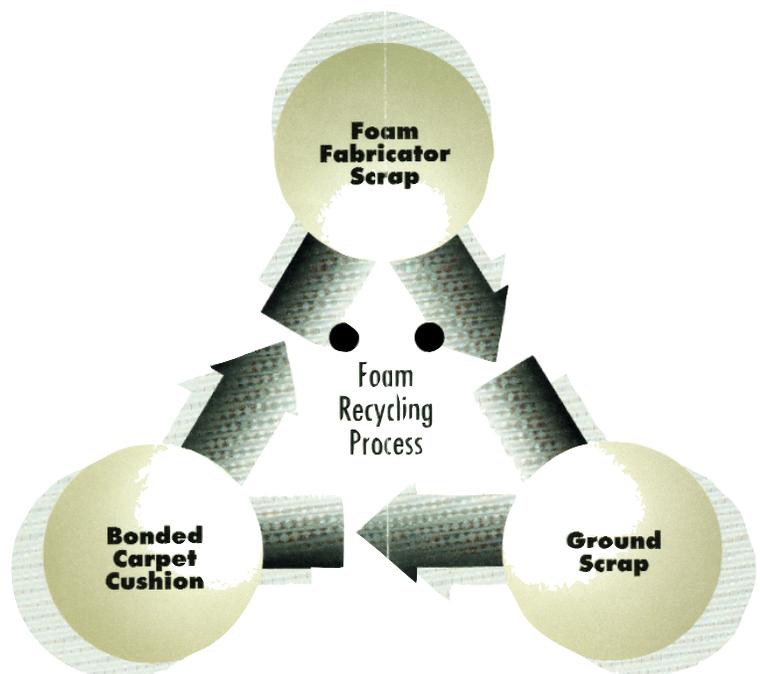
Driven by bottom-line considerations, polyurethane foam recycling is gaining steam industry-wide. But, it's good to keep in mind that recycling provides a significant environmental benefit.



Bonded foam "logs" are peeled to form carpet cushion. Today, bonded carpet underlay comprises the majority of all carpet cushion sales and is preferred by many retailers for quality and performance.

Long before the current recycling boom, the flexible polyurethane foam industry began working to create a market for recycled fabrication scrap. So, only a small portion of polyurethane foam waste ends up in landfills. Growth in the U.S. market for bonded carpet cushion has greatly reduced landfill tonnage. And Landfill Use Avoidance is a major objective in our ongoing recycling system.

By importing scrap from other countries that have less demand for recycled foam, the U.S. polyurethane foam industry also helps to reduce the global solid waste problem.



Valuable End-Users

While the majority of polyurethane foam scrap is processed into bonded carpet underlay for the U.S. market, scrap can also be shredded and used as packaging and stuffing for pillows and plush toys. Its relative high density and excellent resilience make foam scrap suitable for some furniture cushioning, sound insulation, gymnastic mats and other value-added applications. Other markets, such as Europe, are rapidly developing innovative uses for scrap to provide high-value products for their consumers.

Since its inception in 1990, the PolyUrethanes Recycle & Recovery Council (PURRC) has aggressively worked to identify, demonstrate and promote commercially viable technologies for recycling and/or recovering polyurethane process and post-consumer scrap. PURRC's efforts continue in pursuing methods for reducing waste and in discovering new uses for recycled polyurethane foam products.

A Promising Future

The flexible polyurethane foam industry is a leader in recycling. It has made a significant contribution to Landfill Use Avoidance. More and more end-product manufacturers are able to utilize the recycling process because of its convenience and economic benefits. With more applications being developed and recovery of post-consumer waste making progress, the future impact of recycling polyurethane foam is promising.

Recycling Success: Rebonded Flexible Foam

Bonded foam, or rebond, is a carpet cushion product made from pieces of shredded flexible polyurethane foam, held together with a polyurethane binder. Bonded carpet cushion produced from recycled scrap is one of the most popular categories of carpet underlay.

Foam pieces from various sources, such as fabrication scrap and post-consumer waste, can be suitable for rebonding. Currently, most scrap used in rebonding is generated from fabrication scrap supplied by end-product manufacturers. Granulator machinery is normally used to shred scrap foam into small pieces or very thin strips. From a storage hopper, the small foam pieces are fed into a blend tank where the ground foam is sprayed with a polyurethane binder. Once coated with binder, the foam is fed into mold. Both batch and continuous processes are used for rebond. The batch process compresses the foam in a mold to achieve a desired density. After curing, the mold is opened and the product is prepared for peeling.

With the continuous process, the rebond mixture is poured onto a

moving conveyor belt. Another belt, positioned above, compresses the mixture. The rebond material is then peeled or slit into the needed thicknesses for carpet underlay. A plastic film backing or non-woven backing can be applied, before the finished carpet underlay product is packaged.

For more information on bonded carpet cushion and other types of high performance polyurethane carpet pad products, see INTOUCH Vol. 1, Number 4.

Follow Fire Safety Guidelines When Storing Scrap

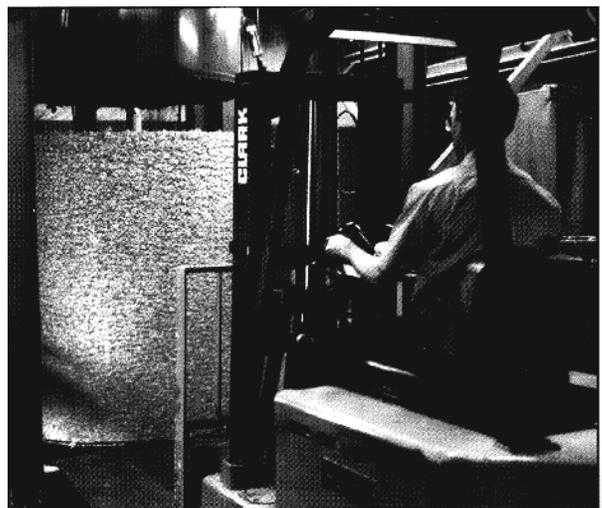
Like all organic materials, flexible polyurethane foam is combustible. Organic materials include a wide variety of substances like wood, wool, paper, cotton, nylon, polyester, and polyethylene.

Polyurethane foam, once ignited, can burn rapidly, consuming oxygen at a high rate and generating great heat and hazardous gases, such as carbon monoxide.

Therefore, fire safety is critical in relation to any storage and handling of flexible polyurethane foam.

Foam should not be exposed to open flames or other direct or indirect high-temperature ignition sources, such as burning cigarettes, matches, fireplaces, space heaters, forklift tailpipes, welding sparks, or bare light bulbs.

For further information on foam storage and handling procedures, see INTOUCH Vol. 2, Number 1.



The polyurethane foam industry has created a market for virtually all fabrication scrap generated in the United States. Collected foam waste is shredded and processed into bonded carpet cushion.

Summary

- ▶ With its system for recovering and recycling post manufacturing scrap, the flexible polyurethane foam industry practices Landfill Use Avoidance.
- ▶ Recycling now provides a market for virtually 100 percent of all flexible polyurethane foam scrap generated during product fabrication.
- ▶ For manufacturers, selling foam scrap is easy and convenient. Buyers are easy to locate and are aggressively looking for scrap sources to meet the great market demand.
- ▶ Sale of flexible polyurethane scrap helps reduce the cost of foam for end-product manufacturers, making flexible foam a very economical material for cushioning, filling and stuffing applications.
- ▶ The major use of recycled foam is in bonded carpet underlay. Bonded carpet underlay is considered to be among the highest quality and best performing carpet cushion products.
- ▶ Value-added products, such as rebond carpet underlay, packaging material, and pillow stuffing are providing a large market for scrap.
- ▶ New end-use applications are being developed to increase the recycling of foam products.

This information is provided as a service of the Polyurethane Foam Association to improve the understanding of key issues that affect flexible polyurethane foam cushioning. To learn more about specific foams, contact your foam supplier.

This bulletin is intended to serve as a reference regarding the general properties and uses of polyurethane foam, and has been developed as a service for the Polyurethane Foam Association's (PFA) members and their customers. The information contained in this bulletin is offered in good faith, developed from sources deemed to be reliable, and believed to be accurate when prepared, but is offered without warranty, express or implied, as to merchantability, fitness for a particular purpose, or any other matter. The PFA and its member disclaim all responsibility for any loss or damage arising from reliance on such information by any party. This bulletin is not intended to be all inclusive on any subject matter. The PFA makes no endorsements, assurances, warranties, or guarantees concerning the quality, uses, or applications of polyurethane foam or specific products produced from polyurethane foam. PFA does not endorse the proprietary products or processes of any manufacturer. PFA and its members do not assume any responsibility for compliance with applicable laws and regulations. The PFA makes no representations regarding the combustibility of polyurethane foam under different applications or in different formulations. It is the responsibility of readers and purchasers or users of polyurethane foam to acquaint themselves with its combustibility characteristics both as to usage and storage, and any questions concerning applications and the combustibility of polyurethane foam must be directed to individual foam manufacturers or suppliers.

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