

## **Fullback® and the Environment**

### **Environment**

Expanded polystyrene is made from styrene monomer and hydrocarbon blowing agents. Molecules of styrene monomer are linked together to form the polymer called polystyrene. Styrene has been produced synthetically since the 1930s from ethylbenzene, which is derived from byproducts of natural gas and petroleum processing.

Styrene also is a naturally occurring substance that has been known since the time of the ancient Greeks. It is found in many foods and beverages, such as milk, beer, coffee, strawberries, peas, tomatoes, olives, and various nuts. Styrene is approved by the Federal Food and Drug Administration (FDA) for use as a flavoring agent.

Man-made styrene is used not only to make polystyrene, but also in the manufacture of products such as automobile parts, electronic components, boats and other recreational vehicles, and synthetic rubber.

The low levels of residual styrene found in expanded polystyrene products are environmentally safe for use in packaging. Independent research shows no adverse health effects in animals exposed for their lifetimes to styrene at concentrations of up to 250,000 parts per billion, 10,000 times higher than potential exposure from food service products.

Expanded polystyrene is approved by the Federal Food and Drug Administration for use in food contact packaging. It has been shown in several studies to be more sanitary than reusable ware. Many health organizations, in fact, encourage use of polystyrene because it does not support the growth of bacteria, as reusable ware does. Expanded polystyrene's light weight, excellent thermal insulation and sturdiness make it easy and safe to use by persons of all ages.

### **Biodegradability**

The biological inertness of expanded polystyrene is especially suited for building insulation. Expanded polystyrene products are inert and safe in landfills, although they will not decompose. In fact, nothing readily degrades in landfills — not EPS, nor paper, not food, or yard waste. Landfills are designed to entomb material and prevent biodegradation due to the lack of oxygen required for decomposition. Furthermore, Martin B. Hocking, Associate Professor of Chemistry at the University of Victoria, British Columbia, reports in "Science," 2/1/93, that when it does occur, 1,000 lbs. of paper will degrade to 394 lbs. methane (a greenhouse gas) and 545 lbs. carbon dioxide.

## **Recyclability**

Polystyrene is a thermoplastic, which allows it to be continuously melted and reformed, making EPS a highly recyclable product. Collecting expanded polystyrene for recycling presents a challenge making consumer participation critical to recycling success.

Progressive is committed to recycling. We channel 100% of our Fullback off-fall or waste from our manufacturing processes to some form of recycling. It is either processed into other EPS products or densified and sent to a recycling plant where it is returned to polystyrene resin.

Recycling, however, is not the sole solution to responsible waste management. An integrated, balanced approach involving source reduction, recycling and waste-to-energy conversion is required for effective control of waste.

## **Waste-to-Energy**

Expanded polystyrene, when converted in state-of-the-art incineration systems, will yield 17,000 to 18,000 BTUs of energy per pound, which is more than coal. Inasmuch as expanded polystyrene consists solely of hydrogen and carbon, complete combustion yields only carbon dioxide and water vapor. In fact, EPS may well be the cleanest burning fuel available.

## **Clean Air**

EPS is defined by the environmental "green movement" as a "green building product."

The most significant potential emission to the air from expandable polystyrene manufacturing and expanded polystyrene molding operations is pentane. Pentane is a paraffin hydrocarbon and is not considered a hazardous substance by the U. S. Department of Labor for Occupational Safety and Health Administration (OSHA). Expandable polystyrene typically contains 3 to 6% by weight of pentane. Consequently, the manufacturing of 1,000 pounds of expanded polystyrene could emit 30 to 60 pounds of pentane. Since the EPA classifies pentane as a volatile organic compound (VOC), manufacturers collect and destroy it in accordance with applicable local regulations. If released to the atmosphere, pentane tends to cause a net increase in the ground level ozone layer. However, its contribution to the ozone as a "greenhouse" gas is believed to be significantly less than that of the methane generated from paper products in landfills.