

Benefits and Uses of Vinyl Chloride Monomer

Vinyl Chloride Monomer (VCM) is a basic chemical building block and is mainly used as a raw material in the production of Polyvinyl Chloride (PVC). PVC is used to make "vinyl" products. Vinyl is the second largest volume plastic produced in the world. U.S. production alone currently exceeds 15 billion pounds annually, and 40 billion pounds worldwide each year. Applications are found in most industries, including communications, automotive, retailing, textiles, construction, health care, aerospace, durable goods and agriculture.

Major uses include water distribution, irrigation and sewer pipe, wire and cable insulation electrical conduit, floor and wall covering landfill liners, piping used in food processing, fencing and house siding. Toys, upholstery, floor mats, body side moldings, adhesives and sealants, surgical equipment and patio furniture.

FACTS ABOUT VINYL CHLORIDE MONOMER

- Vinyl is the world's second most widely used plastic material.
- Over 50 percent of all vinyl produced is used by the construction industry, and more vinyl is used in construction than any other plastic. Therefore, vinyl is often referred to as the "infrastructure plastic".
- Over 50 years ago, vinyl was first introduced, making it one of the most time-tested synthetic materials in use today.
- Vinyl's first major use was as a rubber insulation replacement for wiring on U.S. ships during World War II.
- PVC water pipe economically delivers pure water to even the most remote location; PVC irrigation pipe helps increase crop yields; PVC sewer pipe helps insure the integrity of waste water handling systems.
- Vinyl medical goods and pharmaceutical packaging provide a higher, safer standard of health care.
- Vinyl's inherent flame retardance has made it the dominant material for many electrical uses and has helped make electrical service safer and more dependable.
- Vinyl's durability and comparative low cost helps make housing more affordable.
- Vinyl packaging helps reduce food spoilage and waste. It is virtually unreplaceable in meat wrap.
- Vinyl is a small, manageable part of the solid waste stream.
- Vinyl can be safely incinerated and landfilled.

RECYCLING VINYL

Millions of pounds of vinyl are being recycled each year. In 1995 alone, approximately 9.5 million pounds of post-consumer vinyl was recycled. In addition to this, an estimated 300 million pounds of pre-consumer vinyl scrap was diverted from landfills to be recycled into second-generation products. Long-lived vinyl applications are also being recycled. Examples of this are vinyl siding, wire and cable scrap, and computer keyboard housings. Special grades of PVC pipe now contain an inner core of recycled vinyl.

Recently, the University of Toledo identified nearly 100 potential uses for recycled vinyl, most in non-packaging applications. The demand far exceeds the supply. The University estimated potential demand for recycled vinyl at about 500 million pounds per year. This is more than twice the amount available by recycling all vinyl bottles.

Numerous commercial products contain recycled vinyl. The vinyl industry has helped sponsor the development of several automated technologies that separate vinyl packaging from other plastics in the waste stream. These systems are now in commercial use in at least 40 locations throughout the U.S. and Europe.

INCINERATION OF VINYL

Incinerator scrubbing systems can remove about 99 percent of the hydrogen chloride (HCl) generated by incinerating vinyl plastics and other chlorine-containing compounds and materials. Research indicates that this can be done at a minimal cost.

Studies done in Europe and Japan show that only 0.3 percent of all atmospheric acidity can be traced to incineration of vinyl, which in turn represents only 0.02 percent of all acid rain. Power plants and auto exhaust are the main sources.

LANDFILLING

Vinyl products are extremely resistant to the corrosive conditions found in landfills and will not break down or degrade under them. In fact, vinyl is often used to make landfill liners because of its resistance to these conditions and PVC pipe is used to collect landfill leachate.

VINYL PLASTICS: AN ENVIRONMENTAL PROFILE

Vinyl has become one of the most widely used materials in part because of its cost-efficiencies and economic use of natural resources. These efficiencies begin when vinyl is produced, and continue throughout its lifecycle, encompassing such elements as raw material usage, energy used in processing, energy used in maintenance requirements, and disposal costs.

Vinyl is only partially derived from nonrenewable petroleum feedstocks. The balance comes from salt, an inexpensive, renewable natural resource.

Vinyl compares favorably to other packaging materials. In 1992, a lifecycle assessment comparison of specific packages made from glass, paperboard, paper, and selected plastics concluded:

- Vinyl was the material with the lowest production energy and carbon dioxide emissions and the lowest fossil fuel and raw material requirements of the plastics studied.
- The vinyl chloride monomer (VCM) production process (the first step to vinyl production) is a classic use of in-process waste minimization since virtually all material used to make it is recycled back into the process.

Vinyl is one of three plastic materials with the lowest energy requirements of twelve major plastics used. The use of vinyl in the transportation market saves an estimated 10 trillion BTU's per year--the equivalent of 1.7 million barrels of oil, or ten billion cubic feet of natural gas. The use of vinyl in eight major building and construction applications saves an estimated 250 trillion BTU's per year--

the equivalent of 44.2 million barrels of oil, or 260 billion cubic feet of natural gas. Together, the use of vinyl in the transportation and construction markets alone saves 270 trillion BTU's per year—enough to meet the annual energy requirements of nearly 2.7 million households.

Additional resources are saved because of the durability of vinyl. Some PVC pipe installations, for example, have been in use for nearly 50 years and do not yet need to be replaced. By reducing the frequency with which a product must be replaced, vinyl further reduces raw material consumption, as well as demolition scrap destined for landfills.