Ten Facts to Know about Plastics from Electronics

From computers and cell phones to televisions and microwaves – durable, lightweight, affordable plastics have helped to revolutionize the electronics we rely on every day. Plastics deliver a range of performance benefits that no other material can match. And, because of their unique combination of performance properties, plastics inspire both innovative new products and the more efficient use of resources. In other words, plastics enable many of our favorite electronics to do more with less.

As plastics have become integral to the electronic industry, important questions have been raised about managing the plastics from end-of-life electronics. For instance, can plastics from electronics really be recycled? The growing body of scientific knowledge clearly indicates “yes” for a large and increasing percentage of recovered electronics.

Even so, developing a recycling infrastructure will take time. As the search for answers continues, it is imperative that decisions be based on sound information. Here are ten things to know about plastics from electronics.

1. **Plastics Make Up Only 17% of Electronics.**

   When you think about end-of-life electronics (old televisions, computers, monitors, keyboards, telephones, household appliances, etc.), plastics might seem to be the primary material. They are certainly the most visible. This is because the “ housings,” or the outer casings that enclose electronics, are often made with plastics. Yet studies on both sides of the Atlantic Ocean have documented that plastics make up a smaller portion of end-of-life electronics than commonly believed.

   Several analyses of electronic products collected from industrial, commercial and residential sectors indicate that plastics comprise only 17 percent by weight — about one-fifth — of materials found in end-of-life electronics.

2. **There Are Only About Twelve Types of Plastics Used in Electronics.**

   Recent electronics recovery studies in the United States and Europe found only eight and twelve different types of plastics, respectively, in the electronics collected.

   One particular type of plastic — high-impact polystyrene (HIPS) — accounts for more than half of the total plastics available from recovered household electronics. This is because HIPS is the leading plastic used in televisions, and televisions are the items most commonly recovered in current consumer collection programs.

3. **Different Plastics Are Being Identified and Separated for Reprocessing.**

   More than a decade of research has resulted in commercially available recycling equipment that can accurately detect more than 20 kinds of plastics, identify various additives used in plastics, and separate different plastics into single generic plastic streams for reprocessing.

   Today’s technology even enables recyclers to separate plastics with flame retardants (FRs) from those without. Recyclers can now direct recovered plastics that contain FRs into products that must meet strict fire safety standards.

4. **Reprocessed Plastics Have Market Value.**

   One of the ongoing challenges with recycling any material involves the value-to-recovery-cost ratio — or determining whether the potential value of a recovered material can offset the costs of reprocessing and remarketing it.

   Electronic products are often made with “engineering thermoplastics,” a class of plastics that usually have higher market values than other grades. Engineering thermoplastics, for example, typically sell for significantly more than commodity grades, presenting what the Minnesota Office of Environmental Assistance has deemed “the single greatest opportunity for adding revenue to the electronics recycling process.”

---

**Quiz**

The number of different generic plastics used in electronics today is:

- A) <1,000
- B) <500
- C) <100
- D) About 12

**Answer:** D
Markets for Reprocessed Plastics Are Growing.

To date, lumber, outdoor furniture and roadbed materials have been the primary markets for recovered electronic plastics, but many new product applications are now under development. Some of these include camera casings, battery boxes, compact disc trays, hot mix asphalt concrete, and high quality pellets for use in molded plastic parts. As plastics from electronics are recovered and reprocessed on a more consistent basis, this developmental research helps demand for them to increase accordingly.

Recovered Plastics Will Be Used in High-End Applications.

Researchers working with the electronic plastics supply chain have identified more than 30 products that are now considered viable end markets for engineering thermoplastics from recovered electronics. These include parts and products in several market sectors: telecommunications, automotive, electrical, construction, shipping, traffic control, computers, and household appliances.

In order to facilitate the use of recovered plastics in these markets, current research efforts are focused on measuring the performance properties of different types of recovered plastics and developing a common language to help buyers and sellers determine what plastics are available.

Exporting Plastics from End-of-Life Electronics Can Be a Responsible Choice.

Today's global economy depends on trade, including the import and export of scrap materials for recycling. When carried out in a responsible manner, this activity makes significant contributions toward achieving the goals of sustainable development. Although some electronics contain hazardous materials – such as lead, cadmium and mercury – in the vast majority of cases, electronic products and the resulting scrap are managed responsibly.

Unfortunately, however, some instances involving the mis-management of exported end-of-life electronics have been documented. For example, open burning of electronic parts to retrieve metals has been reported in parts of Asia. When responsible parties purchase end-of-life electronics and/or scrap plastics, these materials are destined for new products, not open burning. It's important to remember that plastics themselves are not inherently hazardous.

There Is No Silver Bullet for Managing Recovered Plastics from Electronics, But Integration Is the Key to Optimal Results.

Recent events in Europe may have caused some people to believe that waste-to-energy is the preferred option for managing the combustible fraction of end-of-life electronics.

In the United States, however, current policy supports the integration of multiple options for handling plastics from end-of-life electronics. This approach includes varying combinations of mechanical recycling, feedstock (or chemical) recycling, energy recovery, and when necessary, the safe landfilling of plastics, as supported by current U.S. regulations. Numerous studies have shown that all of these options can be viable for managing plastics from end-of-life electronics. The optimal combination of management options in any particular region depends on the resources, technologies, and supplies of material available.

Flame Retardants Help Save Lives and Improve the Remarketing Value of Some Electronic Plastics.

Flame retardants (FRs) are added to some electronic plastics to enhance their resistance to fires. FRs help manufacturers meet strict fire safety standards and, ultimately, help save lives.

In recent years, there have been questions about the potential health and environmental impacts of FRs made with bromine, or BFRs. Bromine is found widely in nature and used in a variety of applications, such as water purification, photographic film and pharmaceuticals. The types of BFRs most commonly used in electronic products – deca-brominated diphenyl ether (deca-BDE) and tetrabromobisphenol-A (TBBPA) – provide an exceptional level of fire safety and have undergone extensive testing for potential health and environmental effects. Evaluations by government groups have concluded that there is little concern associated with the use of deca-BDE and TBBPA in electronic products.

The Plastics Industry Continues to Be a Significant Contributor to Recycling Efforts for Plastics from End-of-Life Electronics.

For more than a decade, the American Plastics Council has helped to promote the sound recovery and recycling of plastics from electronic products. Our efforts include (1) supporting public and private initiatives to determine how best to collect, dismantle and recycle end-of-life electronics; (2) funding studies to determine the types and quantities of plastics potentially available from recovered electronics; (3) publishing reports on the most efficient ways to recover plastics from durable goods; and (4) participating in national efforts to develop an electronics recovery infrastructure.

Our knowledge base has grown significantly in recent years, but the quest for answers continues. It will take time to establish a national recycling infrastructure. In the meantime, we’re committed to working with stakeholders throughout the plastics and electronics supply chains to advance the responsible and cost-effective management of plastics from electronics.