



What Happens to Recycled Electronics?



Once electronics are dropped off at the Manitowoc County Recycling Center, they are stored in gaylords until they are shipped off to Lamp Recyclers and 5R Processors Ltd. Lamp Recyclers and 5R Processors Ltd. then process the electronics to recover raw materials and/or refurbish electronic components. Below are some examples of the raw material recovery process:

- **Plastic Flotation Separation** - Shredded and co-mingled plastics from electronic hardware are segregated by type, ABS, PSP, PVC, etc. utilizing a flotation process. The segregated plastics are sold to manufactures as production feed stock and/or for plastic blends.
- **Melt/Smelting** – Aluminum breakage (material that has aluminum content) is melted in a furnace and poured into a “sow” form. These “sows” are mill-ready grade and are sold to secondary processors who alloy it for a specific use, or sold directly to manufactures as feed stock. The steel and other metal alloys that are not melted are sold to steel mills and foundries as production feed stock.
- **Shredding** – Low-grade material, such as printed circuit boards are shredded and reduced to metal via an initial bake and then fusion via a pyro-metallurgical process.
- **Precious Metal Recovery** - High-grade component material is processed utilizing a hydro-metallurgical process. This chemical process produces zero waste as chemicals and waste waters are recovered and reused.
- **Wire Chopping** – Copper and/or aluminum core insulated wire is processed through a machine that chops the wire into small pieces. These pieces are fed into a de-stoning separator that uses mechanical and pneumatic forces to separate the metal from the insulation. Both metal and insulation are then segregated and sold.
- **Electrowinning** – Is a unique reverse plating process that allows a high recovery percentage of precious metals, as opposed to various other methodologies.
- **Glass Grinding/Deburring** – Lead glass from cathode ray tubes are initially size reduced. The leaded glass is then sold to cathode ray tube manufactures. The non-leaded glass is size reduced, deburred of sharp edges, and used as granular material substitute in production processes, such as retaining wall brick.

Materials recovered from these processes include:

- Plastic, glass, lead, mercury, steel, copper, aluminum, brass, gold, silver, platinum, and nickel.

Additional information is available at: www.lamprecyclers.com and www.5rprocessors.com

Manitowoc County Recycling Center

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Why is it Important to Recycle Electronics?

Not only does electronics recycling help save natural resources, but it also conserves limited landfill space, reduces air, water, and soil pollution, and creates jobs. The table below lists some of the materials found in an average home personal computer. Other electronics, including TVs, printers, and stereos, contain many of these same materials in varying quantities. So what makes

Composition of a Personal Desktop Computer*

*(based on 70 lb average weight)

Material	Pounds	Use/Location
Silica	17.416	Glass, solid state devices/CRT,PWB
Plastics	16.093	Includes organics, oxides other than silica
Iron	14.330	Structural, magnetivity/(steel) housing,CRT, PWB
Aluminum	9.921	Structural, conductivity/housing, CRT, PWB, connectors
Copper	4.850	Conductivity/CRT, PWB, connectors
Lead	4.409	Metal joining, radiation shield/CRT, PWB
Zinc	1.543	Battery, phosphor emitter/PWB, CRT
Tin	0.705	Metal joining/PWB, CRT
Nickel	0.595	Structural, magnetivity/(steel) housing,CRT, PWB
Barium	0.022	Getter in vacuum tube/CRT
Manganese	0.022	Structural, magnetivity/(steel) housing,CRT, PWB
Silver	0.013	Conductivity/PWB, connectors
Tantalum	0.011	Capacitors/PWB, power supply
Beryllium	0.011	Thermal conductivity/PWB, connectors
Titanium	0.011	Pigment, alloying agent/(aluminum) housing
Cobalt	0.011	Structural, magnetivity/(steel) housing,CRT, PWB
Antimony	0.007	Diodes/housing, PWB, CRT
Cadmium	0.007	Battery, blue/green phosphor emitter/housing, PWB, CRT
Bismuth	0.004	Wetting agent in thick film/PWB
Chromium	0.004	Decorative, hardener/(steel) housing
Mercury	0.002	Batteries, switches/housing, PWB
Germanium	0.001	Semiconductor/PWB
Indium	0.001	Transistor, rectifiers/PWB
Gold	0.001	Connectivity, conductivity/PWB, connectors

these materials hazardous? Improper disposal techniques including roadside dumping and burning can allow heavy metals and toxic compounds to infiltrate into the soil, air, and water. Heavy metals such as lead and mercury have the ability to leach out of electronic devices under certain environmental conditions. Lead in certain quantities can cause physical and mental disabilities in children, and in adults can result in high blood pressure and kidney problems. Additionally, mercury exposure has been found to affect the brain and nervous system of infants. In adults mercury exposure can cause kidney and gastrointestinal problems.

Source: Handy and Harman Electronic Materials Corp.

Available at: http://www.svtc.org/hightech_prod/desktop.htm

Electronics Recycling is on the Rise

Electronics have been collected in Manitowoc County since 2000. Since then, collection amounts have nearly quadrupled! Manitowoc County residents and businesses have diverted over 111 tons of electronics, batteries, and appliances from going to the landfill. That's over 222,000 lbs of material.

