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This invention is the last part of an industry standard process. It holds the key to a manufacturing process that enables a large mix of flame retardant plastics to be safely reprocessed into plastic wood. It is an extruder, and its end product is the eWood.

The Process: The process of recycling/reprocessing plastics already occurs all over the world. This process roughly follows the same lines as other companies but in this case differs with its extruder, a machine which allows a large number of mixed contaminated plastics to be heated and mixed together, without compromising OH&S standards. Key steps in the process include:

The shredder: First eWaste such as phones, photocopiers, printers, faxes, scanners are put into a shredder. The ink or toner cartridges are removed prior to shredding, and put through their own process to remove the toner powder (polymer and carbon black) and ink for their own melting mixing process.

Magnetic removal: The shredded bits & pieces go into a machine which removes the magnetic metal such as iron, steel, and aluminium. These metals are sent to a metal recycler.

Separation: The remaining plastic bits and metal (some metal might still remain, from the printer metal and rollers, which does not get removed in the magnetic stage) then go into tanks full of water and salt (density solution). This buoyancy makes the lighter chopped up plastics float, and some of the remaining metal and heavier plastics with bromine sink

Grinding: The lighter plastics are removed from the heavier plastics and ground to around a 5mm grain, which enables it to be extruded. In the meantime, the black from toner and ink cartridges has been put in a separate simpler extruder and this master mix is then added to the main plastic mix as it heads into the main extruder. It is an important ingredient that will act like a binding agent, helping the other plastics to stay together. Its properties also give the eWood end product its UV screen protection and its black appearance.

The Main Extruder: the method for recycling mixed plastics containing brominated flame retardants. This is the invention that enables the molten mix of eWood to occur. The ground up plastic granules, including the toner/ink mix, are poured into an extruder, and are melted, and the flame retardant gasses are removed.

The molten plastic mix moves towards the exit mouth at the end of the extruder barrel. When it reaches the mouth it is pushed through a die, and emerges as a continuous board. eWood is thus born. Its final stop is at the cooling water bath, so cool the plastic lumber.

eWood: eWood is made from 100% recycled high and low grade mixed plastics reprocessed from pretty much anything. It is black, weatherproof and tough. Like other plastic woods (which also exist), it can be used as a direct replacement for wood in such applications as fencing rails, outdoor furniture, garden edging, retaining walls, sound attenuation barriers and cladding. It is not being advocated for structural use in buildings. It has almost the same characteristics as natural hardwood in terms of look and feel, as well as density and structure, and can be worked, shaped and handcrafted like timber using woodworking tools.

In comparison to commercial hardwoods and other plastic alternatives to timber, eWood has unique advantages in terms of durability and versatility.

Thanks to the recycled toner and its carbon black properties, it is UV resistant. It is also non-porous due to its homogenous mix, and is resistant to bacteria growth and insect attack. If desired, it can also be flame retardant, depending on what plastics are mixed together. This means some flame retardants remain dormant within the plastic, and do no harm, unless, like all flame retardants, they reach their maximum temperature.

The company's entire operation, including the industrial plant and equipment, is powered by 100 per cent green electricity.

