How is fibreglass recycling done?

How exactly is fibreglass recycling done?

Again it is worth to recall the various definitions of recycling here. Especially the open and closed recycling loops. What follows below is a longer, verbatim quote of Sponbergs article, pages 4 and 5. With his generous permission I copied the relevant passages out of that article – they lend themselves perfectly for giving us a good idea about the possible processes:

“Three processing methods are used for recycling fiberglass: grinding, incineration, and pyrolysis.

**Grinding**
is the most obvious one—reducing material to small pieces or powders to be reused in other products. Potentially all material that can be reground can be used as recyclate; there is little or no unused waste.

**Incineration**
or “thermal oxidation,” is burning the material to create heat for other purposes, such as making steam to power turbines that generate electricity. An unfortunate by-product of fiberglass incineration is ash, which— guess what?—usually goes straight to a landfill. The heat content of fiberglass laminates comes from the organic materials in the resin. SMC*, for example, on which most incineration studies have been made, contains only 25% to 30% organic material, so its heat content is low, and its ash content is high. The ash is primarily calcium oxide, which comes from the calcium carbonate, boron, and other oxides in the glass.

*SMC = Sheet Moulding Composite or Sheet Moulding Compound.

**Pyrolysis**
is the process of chemically decomposing or transforming a material into one or more recoverable substances by heating it to very high temperatures in an oxygen-depleted environment. This is different from incineration, which takes place in an open atmosphere….Pyrolyzed fiberglass decomposes into three recoverable substances: pyro-gas, pyro-oil, and solid byproduct— all of which can be recycled. Scrap automobile tires are disposed of by pyrolysis (the tire mountain in the United States is over 3 billion tires, growing at the rate of 250 million tires a year).

To pyrolyze SMC, it is shredded into 2” squares that are fed directly into the pyrolysis reactor by a vacuum assist, which also draws off most of the oxygen in the atmosphere. The reactor is then heated to around 14000F (7760C). At about 5000F (2760C), the hydrocarbons in the resin decompose into gas. The gas is drawn off and sent through a scrubber, which separates it into pyro-gas and pyro-oil. The pyrogas is very clean and has an energy content similar to natural gas. It can be sold as a natural gas replacement, and it fuels the burners of the pyrolysis reactor so that the reaction is self-sustaining. Pyro-oil is similar to heavy crude oil and, as such, it has less value than normal crude oil, but it can be blended with other fuel oils or incorporated into asphalt. Pyro-gas and pyro-oil comprise about 25% of the pyrolysis traction output in roughly equal amounts. These are free of sulphur, halogens, phosphorous, heavy metals, or other elements that can cause environmental problems. amounts. These are free of sulphur, halogens, phosphorous, heavy metals, or other elements that can cause environmental problems.”

**One example from Germany, company Zajon describes the process as follows:**
“The production of cement is dependent on large quantities of sand. And sand is also the main constituent of glass, and thus also of fibreglass. Fibreglass additionally contains polyester which can be used as an energy source in cement production, thereby replacing the use of fossil fuels.”

And about the process itself:
*Fiberline sends the fibreglass waste to Zajons in Germany. Zajons consolidates the fibreglass in a giant crusher and adjusts the calorific value by adding other types of recycling materials.
The waste is sent to the cement manufacturer. Holcim feeds the waste to the huge kilns that produce the finished cement. Recycling 1000 tonnes of Fiberline profiles in cement manufacture saves up to 450 tonnes of coal, 200 tonnes of chalk, 200 tonnes of sand and 150 tonnes of aluminium oxide (Source: Holcim, 2010). And the recycling process produces no dust, ash or other residues.”

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