

## The HDPE Recycling Process

### Lesson Plans

## Activities

What happens to milk jugs when they are recycled? The activity kit that can be ordered from this site contains samples designed to help show the process for recycling HDPE. If you have already ordered the kit, see the enclosed samples of flake, purge, recycled plastic lumber, and recycled plastic sheeting.

The following pictures were taken at Environmental Recycling, Inc., 8000 Hall Street, St. Louis, MO 63147.

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1. Environmental Recycling, Inc. recycles used HDPE bottles into recycled plastic lumber and sheeting. These are some of the examples of types of HDPE bottles (#2 resin code) that are recycled at the plant.



*Slide 1*

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2. The bottles and containers are chopped up into small pieces called "flake" or "regrind" in this machine. The flakes are washed in water and biodegradable soap and then dried. See the sample marked "HDPE Flake" in the sample.



*Slide 2*

3. The clean flake is then stored in boxes until it is ready to be processed into a mass of hot mix. The flake pictured here will be used to make black two-by-fours for park benches.

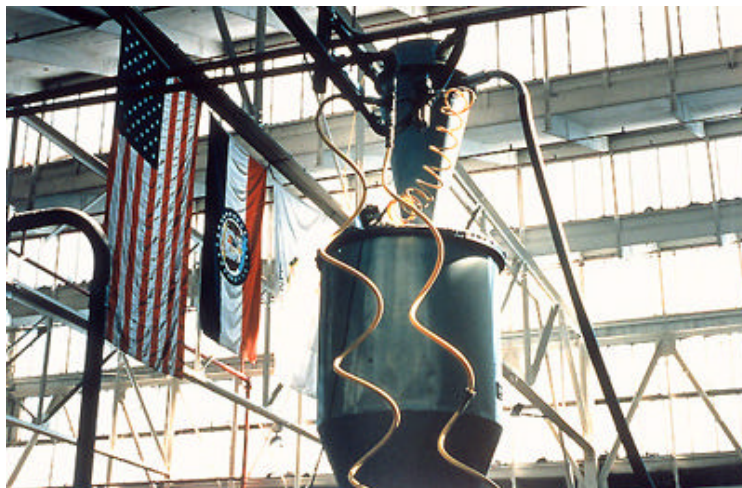
The color of the lumber is determined by: 1) the shades of the bottles going into the machines and 2) the color of the concentrate added to the flake in the next step. For example, a red piece of wood cannot be made with black HDPE bottles. Instead, red concentrate must be mixed with lighter shades of bottles.



*Slide 3*

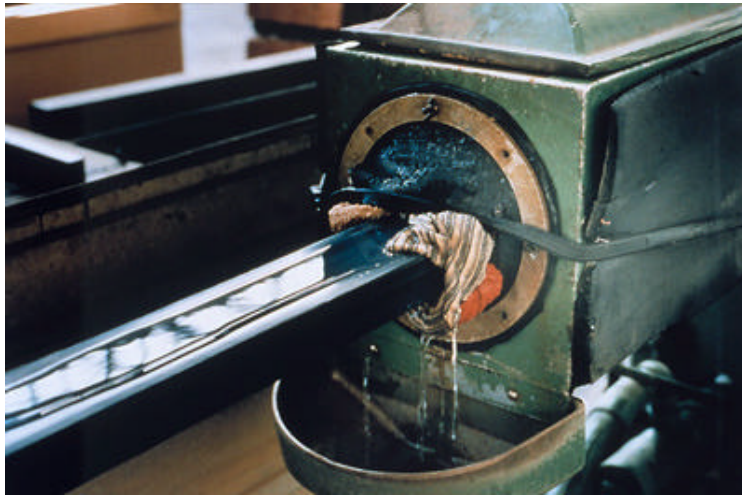
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4. This is the container where the flake is melted and ready to be forced into the dye to make lumber.



*Slide 4*

5. The two-by-four is emerging from the machine. It is over 200 degrees Fahrenheit. As the lumber is pushed out from the dye, excess globs of it fall off. This is called "purge."



*Slide 5*

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6. The two-by-four is pushed through a long trough of water to cool it before being cut into lengths.



*Slide 6*



7. The lumber is cut to the length specified by the customer. In our case, the lumber was cut into 2" X 2" X 4" pieces.



*Slide 7*

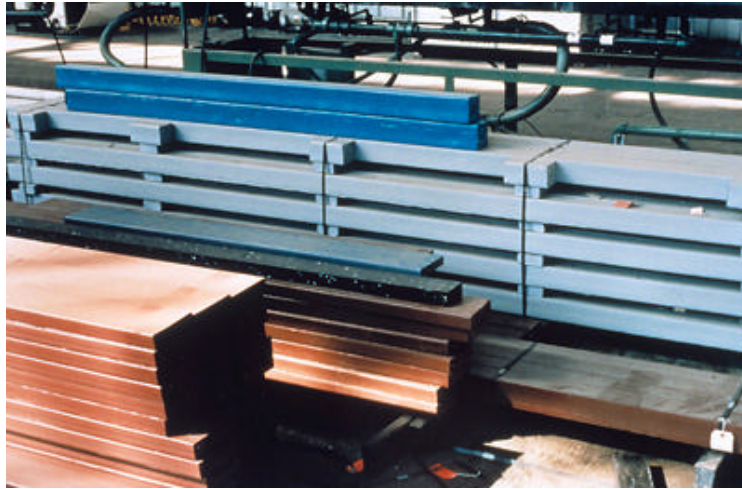
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8. Since the board shrinks when it cools, the board is made larger than the two-by-four dimensions. Here the board is planed to size and uniformity. The mass of a 2" X 6" X 12" piece is about 3.3 pounds. The mass of our piece is about 3.84 pounds.



*Slide 8*

9. Red, gray, blue, and black lumber are waiting for shipping.



*Slide 9*

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10. The finished products are displayed. A picnic table, deck, gazebo, playground, and many other things can all be made from recycled plastic lumber.

- Moisture has no effect on this product, so it can sit out in the weather and not deteriorate.
- Nails cannot be easily driven into the lumber because of its density (similar to oak); therefore, drilling holes and using deck screws or carriage bolts is recommended.
- Plastic lumber does not require painting, will not splinter or crack, and is impermeable to insect attack.
- It can be used in virtually any application where wood lumber would be used, except for very high load bearing instances, and can withstand between five and six thousand pounds of pressure per square inch.
- A piece of recycled plastic sheeting is included in the Hands On Plastics kit. It can also be used in many applications, including boats, crates, walls, and even dog houses.
- Additional products made from recycled HDPE include detergent bottles, recycling bins, backpacks and office products.



*Slide 10*