

Liberty Paper Recycled Paper Making Process

Step 1: Receiving

The recycling process begins with old corrugated containers (OCC). They arrive at Liberty Paper by truck or rail, in bales weighing approximately 1,000 lbs. The bales are placed in the OCC storage area until they are needed by the mill.

LPI draws its steam directly from Xcel Energy. As the steam is used in the LPI drying process, it cools, and becomes condensate, which is pumped back to Xcel.

Step 2: Hydrapulper

The bales are brought into the mill by forklift and placed on a conveyor, which transports them to the hydrapulper.

The hydrapulper mixes water and OCC to form a pulp slurry. At the bottom of the hydrapulper are huge blades that whirl and chop the old corrugated boxes and sheets into paper fibers. Because it uses a mechanical process to break down the paper fibers, Liberty Paper needs no chemicals, unlike a virgin paper mill, which makes paper from wood chips. That's why the only smell associated with our mill is that of wet boxes.

A long rope dangles inside the hydrapulper. Called a "ragger," it pulls out contaminants such as baling wire, tape, staples, old clothing, even rings and wristwatches!

The pulp is piped from the pulper to the pulping screen, where coarse contaminants such as rocks and staples are screened out.

Rejected materials are discharged from the hydrapulper for proper disposal.

Acceptable materials continue on through the process.

Step 3: Screening

Continuous loops called felts carry the paper through the press section, where water is squeezed out of the sheet. At this stage, the paper is about 40 percent fiber, and 60 percent water.

As the pulp moves down the screen toward the press section, the water drains out and the pulp begins to form a sheet of paper.

Step 4: Forward Cyclone

The pulp goes from the screening process to the forward cyclones, which use centrifugal force to separate paper fibers and contaminants. Grease and other heavy materials fall to the bottom, while lighter paper fibers flow to the top.

The reverse cyclone works in the opposite direction to separate paper fibers and contaminants. Heavy paper fibers move to the bottom of the tube. Lightweight plastics and other materials move upward and are rejected.

From the cyclones, the prepared stock goes to storage chests, where it stays until it is needed by the papermaking machine.

A disk thickener thickens the stock before sending it to the refiner.

Step 5: Reverse Cyclone

After refining, the pulp is divided. Pulp which will be used to make the bottom ply of the paper goes from the refiner to the headbox of the papermaking machine. Pulp that will be used on the top ply passes through another set of cyclones for additional cleaning before it, too, is sent to the headbox.

Nozzles on the headbox spray the pulp and water mixture onto a moving screen, or "wire." This is called the "wet end" of the paper machine.

Step 6: Disk Refiner

The refiner has plates with bars and grooves of various sizes. Some are stationary and some rotate. These plates "brush" the paper fibers to give them additional contact points which help them form a stronger sheet of paper.

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Step 7: "Wet End"

As the pulp moves down the screen toward the press section, the water drains out and the pulp begins to form a sheet of paper.

Step 8: Press Section

Continuous loops called felts carry the paper through the press section, where water is squeezed out of the sheet. At this stage, the paper is about 40 percent fiber, and 60 percent water.

As the pulp moves down the screen toward the press section, the water drains out and the pulp begins to form a sheet of paper.

Step 9: Dryer and Reel

The finished paper is wound on a jumbo roller "reel," which weighs 25 tons when full.

As the paper reaches the end of the dryer section, it passes through a set of calendar rolls, which give it a smooth finish.