

THE CIRCULAR CYCLE OF CORRUGATED

According to the U.S. Environmental Protection Agency, sustainability is meeting today's needs without compromising the ability of future generations to meet their needs. It is based on the simple principle that everything we need for our survival and well-being depends on our natural environment. To pursue sustainability is to create and maintain conditions under which humans and nature can exist in productive harmony to support present and future generations.

In current business practices sustainability is understood to encompass businesses' environmental, social and governance practices.

The corrugated packaging industry is a leader in sustainability. For over a century the corrugated packaging industry has built a business philosophy dedicated to responsibility, from worker safety to economic viability and environmental stewardship. The approach extends through the material life

cycle – from forest to mill, to converting facility, to product packager, and beyond to retailer, consumer and recycling at the end-of-life. Made from a renewable resource, reusable, recyclable, and recycled, corrugated packaging comes full circle every day. From efficient use of managed forest lands to sustainable practices during board and box manufacture to high recovery rates that put fiber back into our system, corrugated packaging is truly circular by nature.

Let's explore the sustainable journey of manufacturing boxes from raw materials to the paper mill, at the box plant, and through the recycling process to bring boxes back to be made into new paper and begin the cycle again.

1. Corrugated boxes are used for their intended purpose of product protection and transportation.
2. Old corrugated containers (OCC) are collected as part of a mixed recyclables stream. To optimize recyclability, containers should be free of contaminants.

The collected OCC is sorted, compacted, and baled for space-efficient storage and handling, either at the point of end-use (such as a store or business) or at the recycling center.
3. Bales are transported to the paper mill.
4. Bales are broken open, and the OCC is put into a repulper with water (a huge tub that looks something like a blender). They are then agitated to form a slushy pulp slurry of fiber and water.

Contaminants are removed:

Step A: A big "ragger" chain or rope hangs down into the swirling tub of material. Some contaminants, such as long pieces of rope, string, or tape, plastic, and metal bands, will wrap around the ragger and can then be pulled out of the repulper.

Step B: The remaining pulp slurry goes through multiple cleaning stages to remove heavyweight contaminants like metal and additional contaminants such as plastics and inks before being sent to the paper machine.

5. The highly diluted fiber solution is poured out onto a moving screen, which allows water to drain away, forming a continuous fiber mat. The mat is then pressed between rollers to remove more water.

The wet, continuous fiber web then winds through the dryer section where the top and bottom of the web alternately contact the heated surfaces of the drying cylinders, removing the remaining moisture from the paper.



6. At the end of the paper machine, paper is rolled up on a large reel spool. A full reel of paper can weigh up to 60 tons.

The reel is then slit and rewound into individual rolls. The recycling process is complete; the new paper rolls are shipped to box manufacturers to become new corrugated boxes.

7. New Life

Corrugated board is formed using three or more pieces of paper (containerboard). The outer surfaces are typically linerboard and the inner, fluted paper is usually medium.

The paper, which will become the corrugated "fluting," is softened with steam then fed through a machine called a "single facer." The medium passes between two huge metal rolls with teeth, which give it wavy ridges or "flutes."

8. Starch adhesive is applied to the fluted medium, which is then sandwiched between two flat sheets of paper (linerboard).

9. The combined, 3± layer board passes through curing sections in a continuous web and then is scored, cut into proper size blanks (sheets), and stacked.

To manufacture a new box, the corrugated sheets are passed through machines that print, score, die cut, and fold them. The side seam of the box manufacturer's joint is fastened by gluing, taping, or stitching.

The finished flat boxes are gathered into bundles and stacked, then shipped to the box customer's plant.