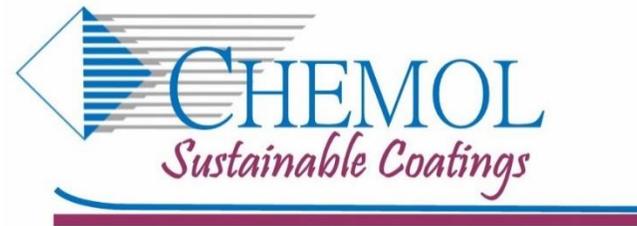


Wax Coatings in Food Packaging

Sustainable, Renewable Alternatives

FRED WELLONS, PRESIDENT



Why do we need waxed boxes?

Water resistance and wet strength

Corrugated cardboard boxes are “waxed” using a paraffin or petrowax coating. The coating provides water resistance and wet strength for demanding applications like chilled water cooling, ice slurry cooling, iced packaging and storage in high humidity, refrigerated environments.

Traditional water-resistant boxes use a petroleum-based paraffin coating (petrowax) that interferes with fiber recovery and renders the boxes un-recyclable.

According to the Coalition for Resource Recovery (CoRR), this results in the landfilling of 1.45 million tons of petrowax-coated corrugated boxes every year.



Petrowax interferes with fiber recovery

During recycling, OCC (old corrugated cardboard) is shredded, mixed in a water slurry, and processed into new paper through the recovery of recycled fibers.

In the water-fiber mixture, the petrowax agglomerates and clogs screens and other processing equipment, leading to decreased fiber recovery.

Box users (restaurants, grocery stores) are required to separate petrowax-coated boxes from non-coated boxes.

Most petrowax boxes end up in landfills.



Landfilled petrowax boxes generate GHG's from the coatings and from landfilled, non-recyclable fiber

- According to the Coalition for Resource Recovery (CoRR), the landfilling of petrowaxed boxes results in the landfilling of 1.45 million tons of paraffin-coated corrugated boxes every year.
- If, instead, these types of boxes utilized a renewable, sustainable alternative that allowed for the boxes to be recycled, then the potential greenhouse gas (GHG) emissions reductions could be tremendous—4.5 million metric tons of carbon dioxide equivalents every year.
 - *That's roughly the same impact as removing 900,000 passenger vehicles from the road or shutting down an entire coal-fired power plant for a year.*
- **The Fiber Box Association estimates that the 1.45 million tons of petrowaxed boxes are landfilled annually at an average cost or tipping fee of \$42 per ton or about \$63 million (2010).**
- **OCC (old corrugated cardboard) is currently valued at \$110 – 130 per ton. This same 1.45 million pounds of boxes, if recycled, would generate revenue of approximately \$180 million.**

The solution: wax alternatives

Chemol Company has developed petrowax alternatives that are derived from natural, sustainable raw materials like vegetable oils and animal fats.

These petrowax alternatives are sometimes called wax alternatives, biowax, biorenewable wax, etc.

The new wax alternatives being substituted for petrowax are similar to the wax used to make soy candles.

The wax alternatives provide similar water resistance and wet strength characteristics.



Wax alternatives

- Wax alternative coatings are cost neutral to box manufacturers.
- Manufacturers can use the same equipment with little or no modification of the coatings process.
- Box users can handle the boxes as usual.
- Note 1: Until there is more education, some recyclers still refuse to take *any* waxed boxes. Boxes may also go to composting.
- Note 2: Fire logs are not necessarily a good choice:
 - Burned petrowax is still non-renewable and immediately generates GHG's upon burning.
 - There are some issues with contaminants in fire logs not related to petrowax.

A typical example



Recycling of wax alternative boxes

Recyclability is certified by the Fiber Box Association and requires that each box manufacturer pass a rigorous FBA fiber recovery protocol.

Recyclable boxes create a revenue stream for Old Corrugated Cardboard (at \$70 – 100 per ton) and they reduce landfill costs and tipping fees.

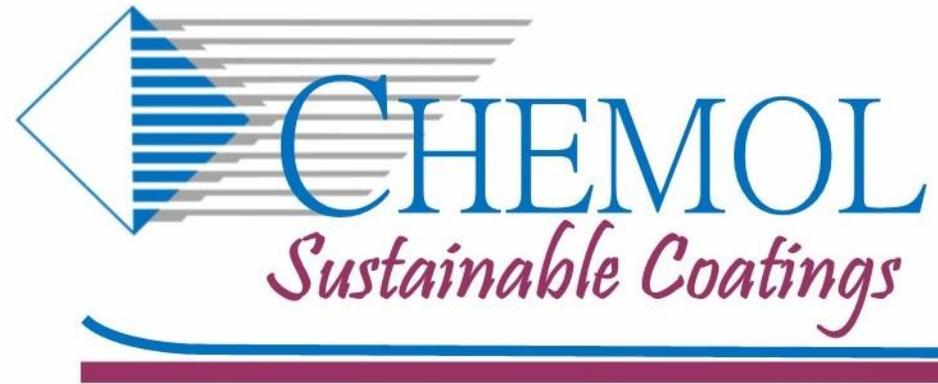
Diverting boxes from landfills to recycling or composting will improve scores in sustainability audits.

In the future, the use of wax alternatives may be mandated (such as plastic bag use in certain areas) or recycling may be incentivized with the use of carbon credits.



Elemental Impact's commitment - *Education and implementation*

- Elemental Impact has been working on project for about three years.
- Now that the technology is widely available and has been fully vetted with box manufacturers.
- EI will begin assisting in market education and implementation
- About 3 ½ years ago, Holly began publication of the blog: [Waxed Cardboard = Landfill = \\$\\$ Lost](#)
 - Published May 20, 2012.
 - 4784 all-time pageviews, 240 in last month.
- In August of 2013, Ei led a trip to Indianapolis to observe waxed box utilization at a Midwest distributor, Piazza Produce. You can review the album at [08-13 Indy Zero Waste Tours](#).



Contact info for Technical Information
Dave Grillo – General Manager
Chemol Company, Inc.
336-333-3050
dave@chemol.com