CORRUGATED CARDBOARD BOXES

Induscorr, a leading manufacturer of specialized cardboard products, produces sheets (single wall, double wall and triple wall), boxes (regular and die-cut), bulk containers, and ESD containers.

Green boxes

Induscorr manufactures a wide range of corrugated cardboard boxes (single wall, double wall, triple wall, etc.) that can be used in many different applications. This flexibility was made possible by Induscorr's thorough knowledge of the different grades of paper available on the market. These different grades can be matched to a variety of technical specifications (density, mechanical resistance, colour, etc.) to meet users' complete satisfaction. The one constant is their environmental features:

All of the grades of paper Induscorr uses to produce its corrugated cardboard boxes are 100% recyclable and compostable.

Various percentages of recycled materials are used in manufacturing the products, however, depending on the grade of paper. The rates can vary from 35% to 100%, but in terms of the paper used to manufacture corrugated cardboard boxes in 2009:

The average percentage of recycled materials in the raw materials was 74%. This means that approximately 220,000 trees are preserved annually and an average of 620,000 m^3 of water is saved every year.

Most corrugated cardboard boxes cannot be made entirely of recycled fibres.
For this reason, Induscorr has selected SFI (Sustainable Forestry Initiative) certified suppliers, which guarantees that:

The virgin fibres used in the raw materials come from sustainably-managed forests.

CORRUGATED CARDBOARD BOXES

Less waste means less to recycle

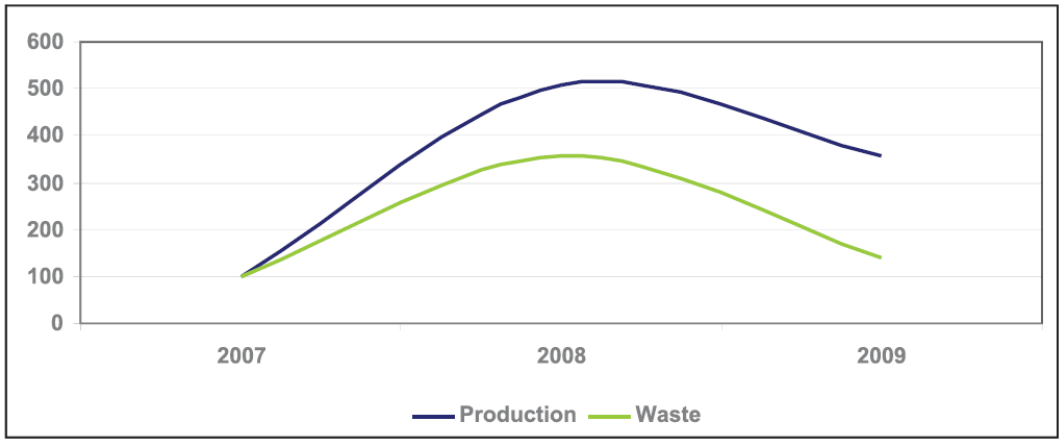
Recycling pre- and post-consumer waste is good for the environment, but in order to minimize its environmental impact, Induscorr strives to reduce its production waste as much as possible.

The best waste is waste that is never produced.

Extra staff was added to the end of the production line. This, combined with quality management systems, helped make Induscorr more responsive, thereby minimizing release rates in each production unit.

The annual release rate, based on an average paper consumption of 17,600 tonnes, was only 13%.

This achievement is illustrated by the following curves: using a base value of 100 for the year cardboard box production began; we can confirm that the amount of releases per production unit has only continued to decrease since that time.



CORRUGATED CARDBOARD BOXES

Giving scraps a second life

Despite the continual improvement process Induscorr implemented to limit the releases in each production unit, scraps remain inevitable.

Scraps are recovered so they can be reused internally by Induscorr and given a second life. Some are used as secondary packaging for corrugated cardboard boxes intended for clients.

Induscorr also uses scraps internally in the transportation of merchandise.

These are just some of the solutions we've implemented to get the absolute most out of the resources consumed during production, and to ensure that scraps are not wasted, but rather are used instead of being sent directly to recycling.

Pre-consumer recycling

Once everything that can be reused on site has been reused, the recycling network takes care of anything left over.

Scraps that cannot be reused are collected directly at the various production lines by a vacuum system that collects them in a central location and sends them to a compactor. They are then returned to the various paper suppliers so they can be reintroduced into the production line.

The amount of scraps returned to paper suppliers for pre-consumer recycling represents, on average, 2,300 tonnes, or approximately 13% of Induscorr's annual paper consumption.

In other words, 87% of the raw materials used by Induscorr ends up in finished products!

Applicable environmental requirements

There are a number of regulations that apply to the raw materials and final products manufactured by Induscorr around the world.

The raw materials used by Induscorr must comply with a number of environmental requirements. The most significant ones are outlined below.

CONEG Model Toxics Legislation

(Coalition of Northeastern Governors)

This law is designed to prohibit the use of the following compounds in packaging and their inks:

- ***Lead (Pb);***
- ***Mercury (Hg);***
- ***Cadmium (Cd);***
- ***Hexavalent chromium (Cr VI).***

These compounds must not be intentionally used in packaging products. In total, their concentration in a given product must be less than 100 ppm (parts per million).

Challenge program

The Challenge is a joint program between Environment Canada and Health Canada.

A key part of this new management plan, launched in December 2006, involves collecting information on more than 200 chemical substances that are harmful to human health or the environment, in order to eventually regulate their use.

These chemical substances are analyzed batch by batch. The twelfth batch of compounds submitted for examination was published on December 26, 2009 in Canada Gazette.

REACH

(Registration, Evaluation, Authorisation and Restriction of Chemicals)

REACH is a regulation that is in force in the European Union. Its primary goal is to regulate the production and use of chemical substances that have a potentially harmful impact on human health and the environment. To date, approximately 150,000 substances have been inspected and registered for REACH regulation.

RoHS

(Restriction of Hazardous Substances Directive)

This directive sets homogeneous metal concentration limits for:

- ***Lead(Pb); mercury (Hg);***
- ***Cadmium (Cd);***
- ***Hexavalent chromium (Cr VI);***
- ***Polybrominated biphenyls (PBB);***
- ***Polybrominated diphenyl ethers (PBDE).***

Concentration limits for the various compounds are 1,000 ppm, with the exception of cadmium, which is restricted to 100 ppm.

SFI

(Sustainable Forest Initiative)

This program, established by the American Forest and Paper Association and the American Timber Industry's Trade Association, has been independent since 2007. It issues certifications that ensure that the wood and paper purchased come from sustainably-managed forests.

The SFI certification program has been recognized by PEFC (Programme for the Endorsement of Forest Certification schemes) since 2005.

CORRUGATED CARDBOARD BOXES

Starch-based adhesives

The main ingredients used to manufacture adhesives at Induscorr are water and starch. These two ingredients represent 95% of the weight of the mixture, with various additives making up the rest.

Induscorr's know-how in producing the optimal mixture and right quantities allows it to select quality raw materials and restrict the release of volatile organic compounds (VOC) to a maximum of 400g/m^3 when the adhesive is used. It also allows them to choose ingredients that comply with the RoHS, REACH and Challenge requirements.

Making its own adhesive also means being efficient and producing only as much as is needed to limit the consumption of resources and creation of residual materials.

Streamlining the distribution of the adhesive enabled Induscorr to reduce its adhesive production, and as a result, its consumption of water and the amount of filter sludge generated from treating the washwater used to clean the adhesive off the equipment.

Between 2008 and 2009, Induscorr lowered its water consumption per tonne of paper consumed by 32%. Given that the average daily water consumption in Canada is 329 litres per person, these savings are equivalent to the annual consumption of over 100 people!

induscorr
Corrugated Packaging

Water-based inks

All of the printing inks Induscorr uses on its corrugated cardboard boxes are water-based inks. They have progressively replaced organic solvent inks, which has helped reduce the organic load of the washwater and assist with its subsequent treatment.

Water-based inks are still synthetic inks, but they comply with a number of regulations, such as the RoHs directive, which restricts PBB and PBDE concentration levels to under 1,000 ppm. Their compliance with the CONEG toxic substances legislation requires their Pb, Hg, Cd and Cr^{VI} content to be under 100 ppm.

Although the inks used by Induscorr contain up to 2.67% of their weight in volatile organic compounds (VOC), their VOC production after application is only 136 mg/m^3 of ink used.

CORRUGATED CARDBOARD BOXES

Water consumption

Water is used at various stages throughout the corrugated cardboard box manufacturing process. The primary ones are the following:

- ***Producing water vapour;***
- ***Manufacturing the adhesive;***
- ***Washing the equipment.***

The water vapour is produced by a natural gas boiler equipped with an adjustable vent. The water vapour is primarily used by the corrugating machine during the cardboard box manufacturing process to soften the stiffest pieces of paper so they can be manipulated easier.

Induscorr produces the adhesive used to manufacture the corrugated cardboard boxes on site. This adhesive, made up of 70% water, guarantees Induscorr will produce quality cardboard boxes.

Induscorr streamlined the adhesive distribution network, enabling it to limit excess adhesive on the equipment. Water is therefore conserved in more ways than one:

- ***Smaller production surplus, therefore fewer resources used;***
- ***Less excess adhesive on the equipment, therefore less water required to clean it.***

The washwater recovered by Induscorr is then directed toward two different physico-chemical treatment processes depending on whether the water contains adhesive or ink. Having two processes means they can be optimized independently of one another, and therefore the wastewater load can be reduced as much as possible.

All optimizations combined, Induscorr reduced its water consumption per tonne of paper consumed by 32% between 2008 and 2009. These savings are equivalent to the average annual consumption of over 100 Canadians!

CORRUGATED CARDBOARD BOXES

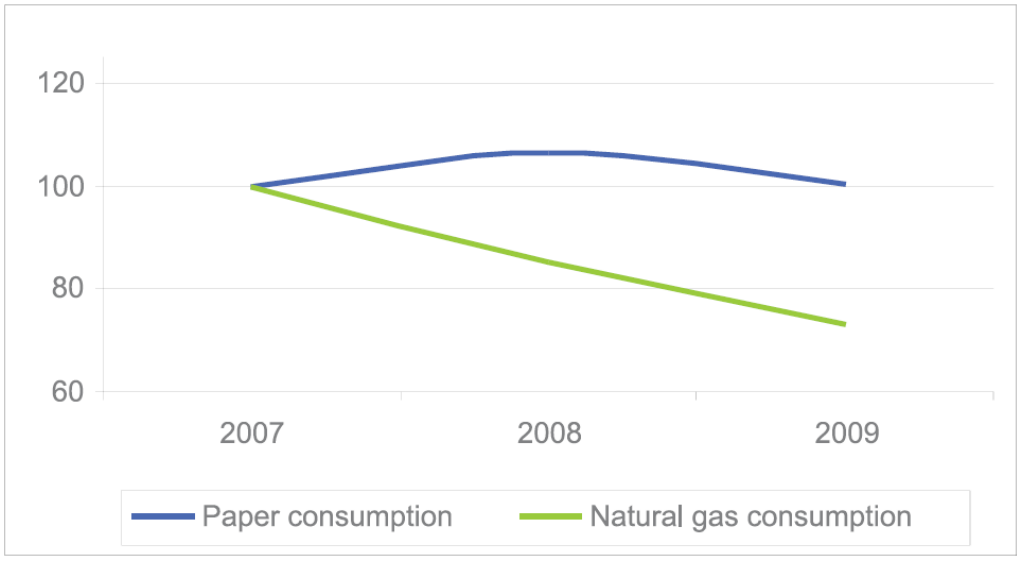
Carbon emissions

The equipment used by Induscorr to manufacture its cardboard boxes all run on electricity. This electricity, supplied to Induscorr by Hydro-Québec, is considered by Quebec's Ministry of the Environment, Sustainable Development and Parks to be a renewable energy that does not emit any greenhouse gases (GHG).

The primary sources of GHG at Induscorr stem from, on the one hand, the vapour produced by an adjustable natural gas boiler, and on the other hand, delivering the finished products to clients.

The water vapour is used in the corrugated cardboard box manufacturing process to soften the sheets of paper, making them easier to manipulate. The vapour is produced on site, in the plant, by a natural gas boiler equipped with an adjustable vent.

Induscorr installed this device in 2008. It helped reduce natural gas consumption by approximately 30%. This reduction is illustrated in the chart below, where estimates of GHG generated by the combustion of natural gas are compared to estimates of the total quantity of paper consumed (index set at 100 in 2007).



Carbon emissions (cont.)

Once produced, the corrugated cardboard boxes are transported by specialized carriers to Induscorr's various clients.

Based on an average consumption of 120,000 litres of diesel for the fleet of vehicles used by Induscorr over the year 2009, the deliveries of corrugated cardboard boxes represent 331 tonnes CO2 equivalent.

In total, for the year 2009, the combined GHG emissions from the production of vapour and delivery of finished products are equal to 2,287 tonnes CO2 equivalent. This is less than the average GHG emissions of 70 Canadian households.