



SUSTAINABILITY WHITEPAPER

Flint Group

TerraCode – Next Generation Sustainable Water-Based
Inks and Coatings for Paper & Board Packaging

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The circular economy is increasingly becoming a global narrative that guides and defines how companies conduct their business. Within the packaging industry, we have witnessed how sustainability has transitioned from buzzword to concrete policy, driving demand for solutions and products that enable a circular economy for packaging.

Flint Group is focused on supporting the industry, its partners and customers, by designing responsibly-built products and sustainable solutions that address key concerns relating to performance, functionality, presentation and efficiency, and at the same time allow a circular economy to flourish.

According to McKinsey & Company¹, the global paper and board industry is going through the most substantial transformation it has seen in many decades. The packaging sector has seen continuous growth in line with GDP both in the corrugated and paper board segments. Flint Group is responding to these changes with innovations that meet the needs of manufacturers and brands today and in the future, and which have sustainability firmly at their core.



Growth in the paper and board packaging industry is driven largely by demographic shifts and a wide range of industry and consumer trends:

Consumer Convenience

Today's consumers are demanding more from their packaged purchases. They are seeking solutions that enable them to eat on-the-go, easily dispense, open and reclose, prepare effortlessly, share... the list goes on. They are looking for versatility and variety enabling them to express their personal tastes and preferences. Variety also enables busy consumers to make healthier choices and brands know that packaging design is directly related to customer satisfaction and brand loyalty. Having such variety in attractive, safe, and functional packaging offers consumers the convenience they crave.

In today's high-volume, fast-paced market, consumer purchasing behaviours can change at a rapid pace. In tandem with well-documented market and supply chain challenges, the need for business agility has never been greater, and brands and their printer partners must be prepared for any eventuality.

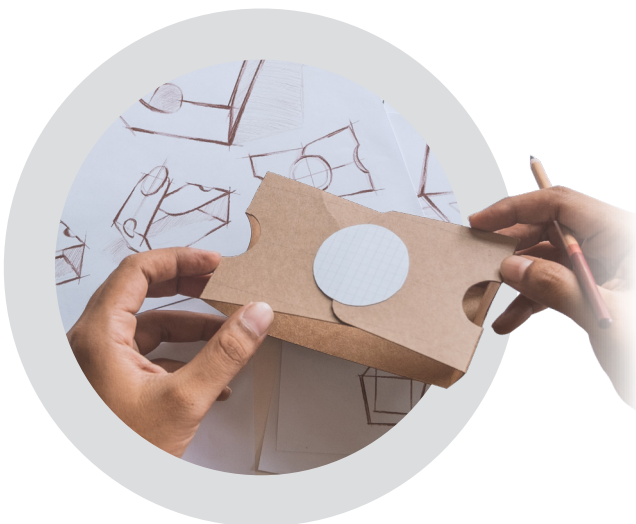
One of the most effective ways to achieve this is bold innovation throughout the supply chain. With the right technology in place, performance can be matched with precision, consistency, sustainability and cost control.



Competitive Intensity

With variety comes competitive intensity. The proliferation of stock keeping units (SKUs) for retailers has accelerated over many years as brands seek to maintain their market share and new entrants compete for shelf space. Standing out on shelf, or indeed online, means innovative packaging design with outstanding graphic appeal is the key to sales growth.

With burgeoning cost pressures across the board faced by brands and retailers, those printers that can provide cost effective packaging solutions with consistent high quality print on a variety of substrates will win out.





Sustainability

From headlines about microplastics in the Arctic to global warming, sustainability is at the forefront of public consciousness like never before. This change represents an important evolution in consumer thinking; shoppers are taking the time to understand and educate themselves about the impact global travel and consumerism have on the environment.

Global packaging sustainability has become an important issue as this awareness has evolved. Consumers have become increasingly concerned about packaging and its contribution to littering and pollution and as a result, brands and their supply chains are investing in innovative ways to meet the challenge of developing highly efficient and sustainable packaging that meets the needs of society, while protecting the environment, today and into the future.

While all packaging formats have their merits in protecting and preserving goods, and in particular minimising food waste, it is clear that many consumers today are seeking alternatives to plastic substrates. The paper and board packaging industry has benefited from brands seeking alternatives to respond to their customers, whilst changes in formats have been keenly felt across a wide range of product categories.

Innovation is therefore a critical success factor for many paper and board packaging suppliers today. They need to deliver the traditional functionality of plastics with fibre-based packaging solutions. From moisture, aroma and gas barriers to outstanding print performance, the paper and board industry is investing in research and development to respond to these new consumer needs.

E-Commerce

The move from 'bricks to clicks' in the retail sector has seen a significant expansion in demand for the paper and board packaging sector in particular. The explosive growth in e-commerce means packs must be available to cope with a wide variety of product shapes and sizes. This has created a need for packaging versatility, but also the requirement for optimisation, standardisation and cost control. The paper and board packaging sector have been the clear winner on this front to date; the corrugated box is now ubiquitous due to its strength, durability, relative low cost and recyclability.

Paper and board printer converters today are therefore seeking solutions that improve the robustness and durability of packaging to meet the rigours of global supply chains.





Responding to today's paper and board packaging market

Flint Group develops, manufactures and markets an extensive portfolio of printing consumables for a wide range of packaging applications. Sustainability is deeply engrained in our values and the way we do business. We have a global commitment to enhance our sustainable solutions and we are focused on understanding our customers' precise needs and responding with insightful innovation across all our product ranges.

Our sustainability vision is:

To support packaging markets with responsibly built products and sustainable solutions designed for circular economies.

At Flint Group, we know that - depending on the packaging application and end-use product to be packed - a number of factors can be considered when developing new sustainable packaging designs:

- *Initial pack size and weight optimisation (light weighting) – lowering resource use and the associated carbon footprint throughout the supply chain*
- *Use of bio-renewable materials*
- *Use of recycled materials*
- *Designing for biodegradability or compostability*
- *Designing for recyclability in line with circular economy principles*
- *Designing for reuse or refilling, thereby creating a second lifecycle for the packaging*

With a wide range of opportunities to improve the environmental performance of packaging, Flint Group understands that not all brands and printers have the same sustainability objectives when selecting their inks and coatings. We are therefore developing a number of new product ranges to ensure we meet a wide variety of customer needs.

Introducing TerraCode

Responding to the specific needs of the paper and board packaging industry to deliver solutions for improved sustainability, packaging innovation and shelf stand out, as well as e-commerce supply chain robustness, Flint Group introduces a new range of water-based inks and coatings under the TerraCode brand.

This range presents a dynamic bio-renewable product offering that can be tailor-made for converters' individual printing needs.



Sustainable Sourcing of Feedstocks

An important consideration during TerraCode's development programme has been the sourcing of carefully selected feedstocks. Ethical debates have occurred globally related to crops, normally used for food production, being diverted to industrial applications. The United Nations estimates that nearly 1 billion people globally are suffering food shortages. At Flint Group, we are acutely aware of the importance of ethical sourcing.

Flint Group believes a sustainable source is equally as important as the renewable content of a product. Therefore, we have extended our strict raw material review policy to include renewable source information.





The Technology

Ensuring tailored solutions for specific printer converter and brand owner needs, the Flint Group development teams have created three product series:

TerraCode² is offered in three variations: TerraCode Bio, Balance and C2C.

- **TerraCode Bio** is designed with the highest level of bio-renewable content. In terms of performance, TerraCode Bio is comparable or even outperforms existing synthetic technology on most paper and board applications while reducing carbon footprint up to 50%.
- **TerraCode Balance** range is built on biomass balance raw material, using natural feedstock. It is designed to maintain the performance characteristics of traditional solutions, supporting a range of high-performance coatings, including products designed for the food service markets. TerraCode Balance enables printers to access a 'like for like' solution, with allocation and certification of the biomass feedstock. Saving up to 75% CO₂ emissions compared to conventional products, and drastically reducing the need for crude oil as feedstock.
- **TerraCode C2C** supports a circular economy, TerraCode C2C products contain raw materials which are certified for Material Health at the Silver/Bronze level by the Cradle to Cradle Products Innovation Institute.



TerraCode inks and coatings:

- BRC certified through NAPIM³
- A selection of products is C2C Certified for Material Health at the Silver/Bronze level
- Sustainably and ethically sourced
- Available print-ready or via a convenient Flint Group building block package
- Significant CO₂ reduction!
- Includes a range of sustainable coatings
- Suitable for food packaging applications





TerraCode applications

The TerraCode range has been designed to support a wide variety of Paper & Board packaging applications including:

Corrugated Pre and Post-print applications

The TerraCode corrugated ink and coating range has been specifically designed to maintain the print and resistance properties of conventional ink systems, whilst maximising the renewable content. Trials have demonstrated that an improvement in trapping and tonal quality can be achieved compared with current synthetic materials.

Food Service Packaging applications

The TerraCode FS range has been created to meet the EN646:2018⁴ resistance specification for paper and board intended to come into contact with foodstuffs. This is particularly relevant for food service packaging applications and determines the colour fastness of dyed or printed paper and boards.

Benchmarking tests against competitive solutions have indicated that the TerraCode FS range demonstrates best in class print coverage, foaming performance and low curl characteristics.

In addition, Flint Group has launched a range of coatings to support polyethylene free paper cup substrates; a key enabler to boost recycling

in the food service sector. These solutions are marketed through the OctaCode and TerraCode brands and have been tested and promoted by packaging substrate manufacturers.

Paper Bags and Sacks

Further extending the application versatility of the TerraCode range, the bags and sacks technology has been specifically designed to maintain the print and resistance properties required for this market application. Again, testing has confirmed demonstrable performance improvements against conventional ink systems.



In summary

By supporting paper and board packaging converters and their customers to meet the key trends and challenges in their industry, along with sustainability objectives, the TerraCode range delivers on the necessary requirements for premium packaging results, such as high print quality, product consistency, and ease of use.

During the development of the TerraCode range, a focus on the environment has not been limited to materials alone. The range has been developed using a combination of naturally occurring feed stock options – natural pigments, resins, additives and biomass balance materials - that do not compete with food or accelerate deforestation.

Flint Group is extremely optimistic about the benefit our TerraCode ink series will have for our paper and board customers' sustainability and print performance objectives. Regardless of which TerraCode product is selected, our sustainable solutions will result in a positive user experience and reduced environmental impact, including a significant reduction in CO₂ emissions.

To find out more please visit
www.flintgroup.com

Exhibit 1



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References:

¹McKinsey & Company Report – Pulp, paper and packaging in the next decade: transformational change, August 7, 2019

²For more information on TerraCode please contact
info.packaging@flintgrp.com

³NAPIM: National Association of Printing Ink Manufacturers

⁴EN646:2018 - determination of colour fastness of dyed and printed paper intended to come into contact with foodstuffs

The aim of our technical documents is to inform and advise our customers.

The information provided herein is correct to the best of Flint Group's knowledge. No liability for any errors, facts or opinions is accepted. Customers must satisfy themselves as to the suitability of this product for their application. No responsibility for any loss as a result of any person placing reliance on any material contained herein will be accepted.

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Global Discovery Centre

VISITING ADDRESS

Flint Group Sweden AB
Höjdrodergatan 20
SE-212 39 MALMÖ
Sweden

POSTAL ADDRESS

Flint Group Sweden AB
P O Box 16082
SE-200 25 MALMÖ
Sweden

FlintGroup