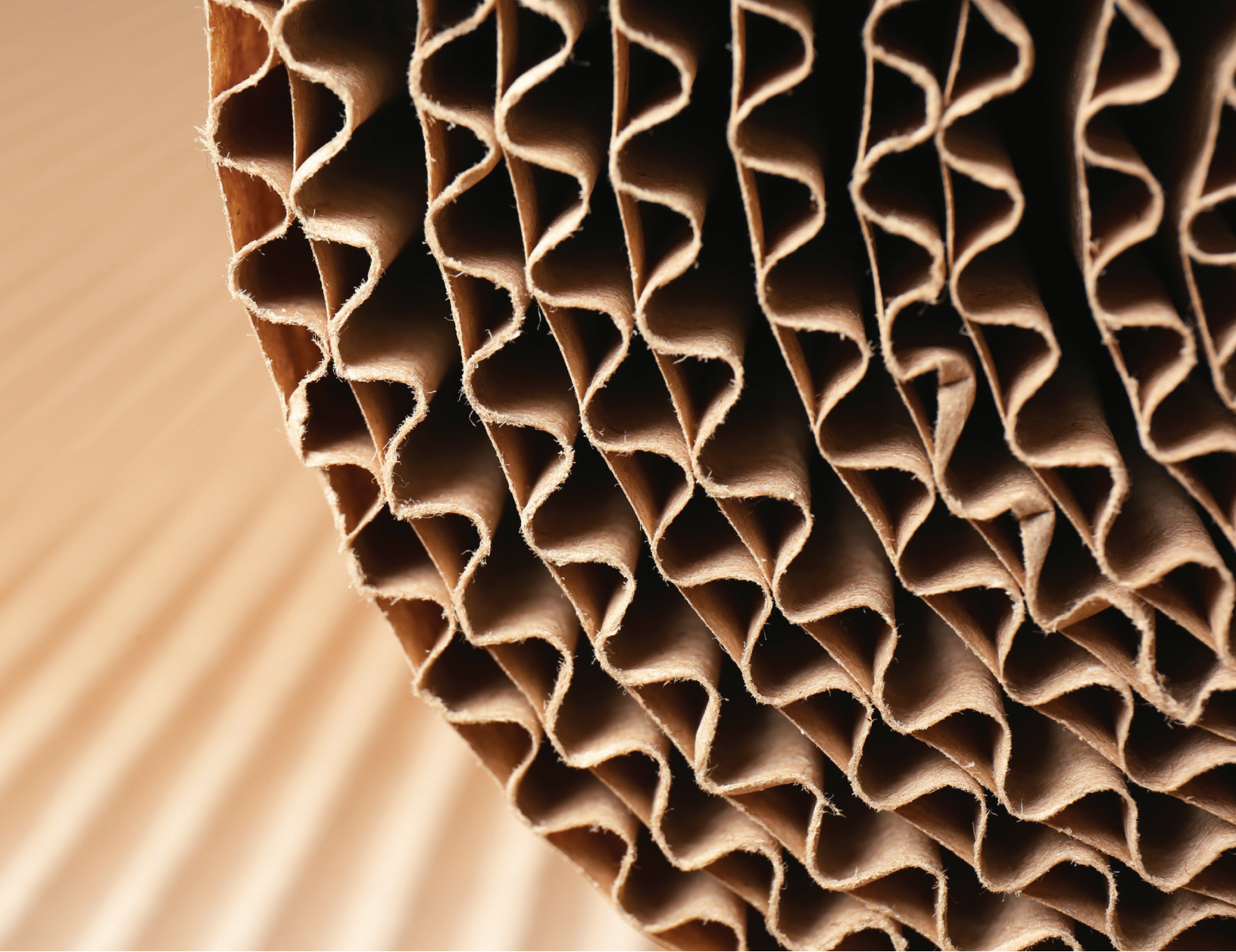




# Delivering Innovation and Expertise to the Board & Packaging Industry

**NALCO** Water  
An Ecolab Company

Nalco Water is committed to providing innovative solutions that meet the demands of the Board & Packaging industry — today as well as tomorrow.

Our integrated approach combines a unique portfolio of programs, on-site expertise, advanced monitoring technologies and automation to meet your goals while optimizing your total cost of operations.



# Why Choose Nalco Water?

Our approach sets us apart. With an unparalleled commitment to personally delivered service and a suite of innovative technologies and science-based solutions, we drive positive economic and sustainable impacts through our customers operations, and the communities in which they operate. Our solutions help customers achieve ambitious business and environmental goals. We deliver exponential outcomes that benefit customers and communities. Fundamental to our approach is an understanding that real and lasting change is accelerated when economic and environmental benefits align. We start with what matters most to our customers — performance — and link performance outcomes to environmental and social metrics and cost savings to demonstrate the triple bottom-line benefits of sustainability.

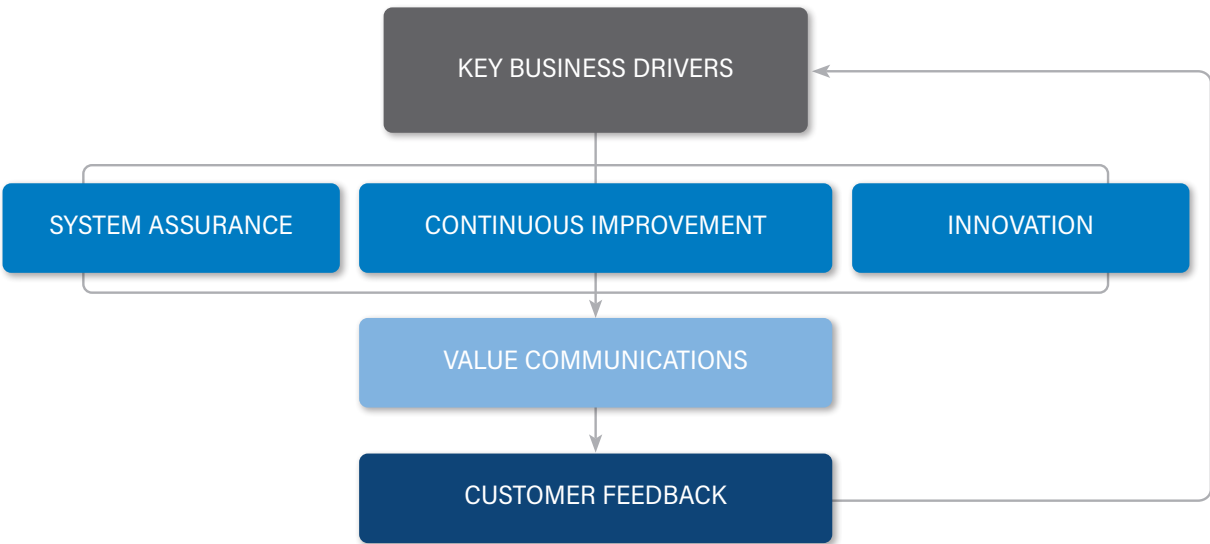
It's why so many industry professionals choose Nalco Water as their partner. Board and Packaging assets present unique challenges, and Nalco Water specializes in complex operations and start-ups and considers all the necessary details. Because of our extensive experience and commitment to excellence, we have a proven track record of helping mills meet and exceed their performance and quality goals with a portfolio of tested and proven innovative technologies and platforms.

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## Creating and Maintaining Value (CMV)

Our grade-based approach enables us to understand and address the unique needs of each industry segment: board and packaging, fiber, graphics, and tissue and towel.

Using our CMV process, our local account team works closely with you to understand and prioritize your needs and objectives. We work with your technical and operations personnel to develop a service and improvement plan to deliver maximum performance from your existing applications. We leverage industry experts, processes and technologies in a manner that is tailored to your operations and key business drivers.



# Delivering Economic and Environmental Value

Nalco Water is firmly committed to the Board & Packaging industry. We partner with producers worldwide to deliver economic and environmental value through our reliable, cost-effective, and safe solutions. Our goal is to deliver a measurable, exponential return on investment, what we call eROI<sup>SM</sup>.



eROI stands for exponential return on investment. It is our process of measuring the benefits of our solutions and services to help customers quantify their return on investment. That includes improved performance, operational efficiency, and positive environmental impact. Our solutions, insights and methodology help our customers not only improve their operations but also give them the ability to track their progress and demonstrate value across a wide range of metrics.



# Research and Analytical Capabilities

Our Ph.D. researchers and technicians are thoroughly trained in board and packaging testing and analysis. Their extensive experience includes operation of state-of-the-art instrumentation and sample analysis. Our analytical labs are ISO 9001:2015 certified.

You can rely on us and our standardized, documented procedures for fast, accurate and comprehensive answers in a wide range of areas. While many development labs perform water analyses, few also have capabilities for deposit, ion exchange, metallurgical, and fiber and paper testing. Even fewer have a global network of labs and expertise ready to assist you. Count on us for insights that can help you and your Nalco Water field representative troubleshoot problems.



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## Innovation

At Nalco Water, we gain considerable insight from our customers, through the challenges they face and the results they seek. This knowledge helps fuel innovation. We develop these solutions by applying a Total Impact Approach to innovation. We look holistically at the environmental, economic, and social impacts of our products and service offerings and consider how each solution will increase efficiency, minimize the use of natural resources, and improve safety.

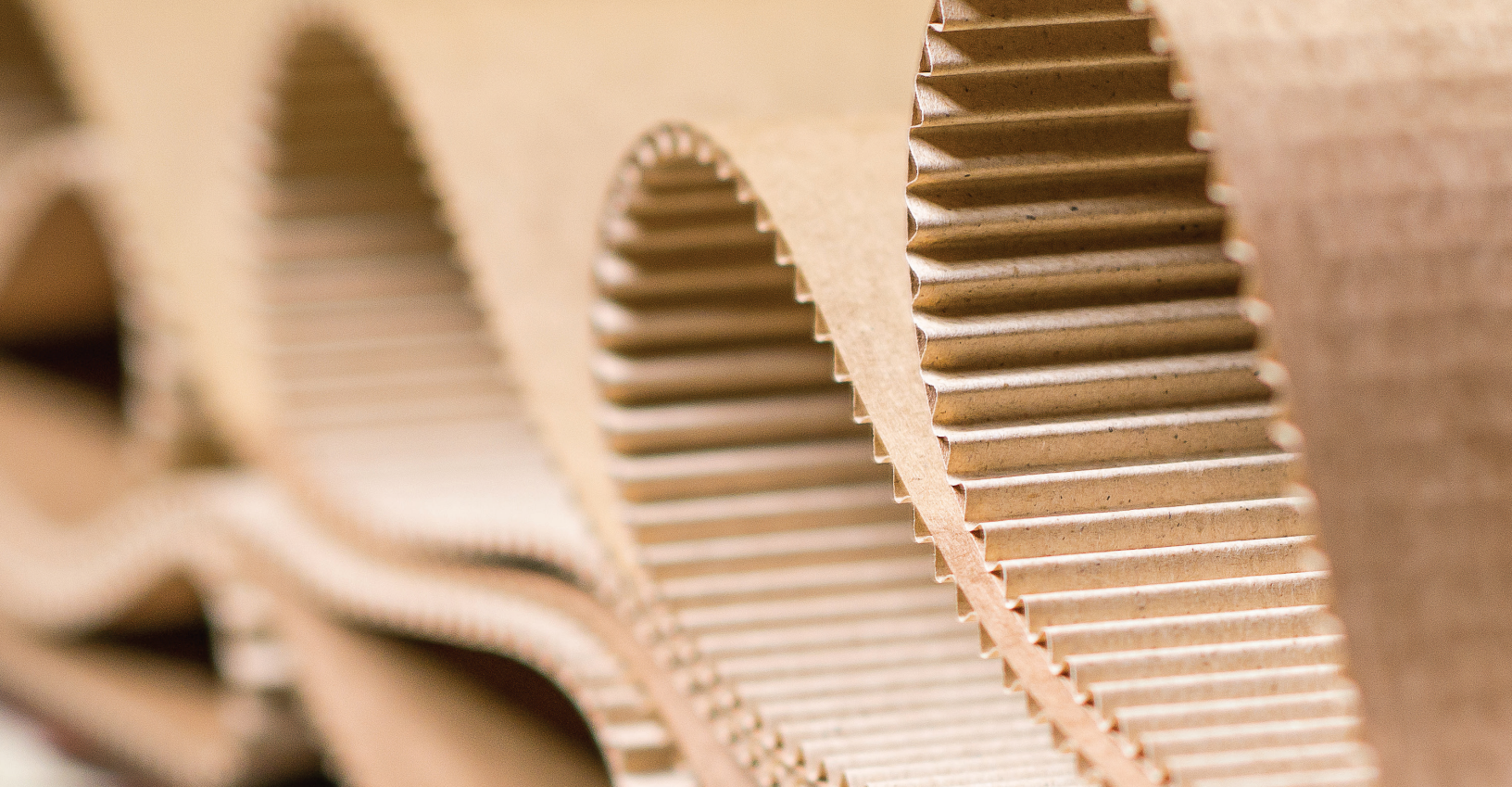
Examples of our innovative packaging production aids include:

- METRIX™ Strength Technologies
- ULTIS™ Dry<sup>2</sup> Strength Technology
- NALSIZE™ Sizing Technologies, Retention and Drainage Aids, Water Clarification, Defoamer Technology, Microbiological Control, and Cleaning Technologies
- PARETO™ Mixing Technology
- 3D TRASAR™ Technology, and more

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## Nalco Water Innovation in Strength Solutions

As the e-commerce industry grows, so does the need for producing an optimal board at minimal cost that is based on finished product performance requirements. Nalco Water understands the complex challenges that board and packaging manufacturers face. Our solutions minimize or eliminate the need to over-engineer the finished sheet — using tools that help us understand and optimize the mechanical, operational, and chemical variables in the manufacturing process.



## Solutions

Board and packaging manufacturers must meet many consumer demands on end-product performance. Our approach takes this into account, and impacts all aspects of board and packaging production, from managing finished product properties to the resources used to manufacture them. We incorporate mechanical, operational, and chemical elements that enable you to run machines faster, cleaner and with less downtime.

In addition, we understand the unique characteristics of strength properties, the critical role they play in the product, and how under close management, they can produce a stronger board.

## Sizing Technology

NALSIZE ONE™ TECHNOLOGY, is a new high-performance emulsifier combined with a sizing agent to deliver a single chemical offering, while providing superior liquid hold-out



## PARETO™ Mixing Technology

PARETO MIXING TECHNOLOGY improves your pulp and paper processes by providing the optimal feeding solution for the interrelated and dependent variables of hydrodynamics, chemistry, and water management.



## Dry Strength

DRY STRENGTH for any paper grade is a balance between fiber selection, basis weight, refining, press loading, and the use of chemical additives to meet the required specification at the lowest cost. Nalco Water has a unique line of dry strength technologies including:

- METRIX™ Technology
- METRIX™ Dragon Technology
- METRIX™ Titan Technology
- METRIX™ Horizon Technology
- METRIX™ On-Site Technology
- ULTIS™ Dry<sup>2</sup> Strength Technology



## Retention And Drainage Performance

NALCO WATER'S WET END OPTIMIZATION PROGRAMS provide unique steps for a wide variety of paper grades and furnishes. The programs integrate our best chemical technologies, engineered delivery systems, and system assurance programs to deliver consistent results.

- CORE SHELL™ Flocculant Technology
- POSITEK™ 4G Colloidal Silica Technology
- HYBRID™ Polymer Technology
- Micropolymer Technology



## Wet Strength

METRIX™ ARMOR is a leading wet strength resin technology for boosting tissue and paperboard strength.



## ECOLAB3D™ Digital Platform

ECOLAB3D™ is a secure, cloud-based, digital platform that translates operating data from multiple sources into actionable insights using advanced algorithms and predictive analytics. ECOLAB3D™ gains real-time visibility and quickly identifies performance opportunities at enterprise, site and asset levels, enabling us to develop insights and predictions that deliver more value to our customers.



## Holistic Water Management Approach

RESTRENGTH™ is a valuable tool for the recycled paperboard industry that sets the foundations for water savings and water reuse. It helps to minimize water use and maximize productivity and paper strength, at an optimized total cost of operations.



## Microbiological Control

OXIPRO™ TECHNOLOGY FOR DEPOSIT CONTROL is our innovative offering for enhanced control of microbial growth and deposit formation in papermaking systems. OxiPRO combines proactive monitoring tools, individually tailored chemistry strategies, and local application expertise to reduce sheet defects, improve runnability and increase uptime.



## Raw Water Treatment

From limited treatment to monitored and customized options, there are a variety of approaches to raw water treatment.

FIRSTCLEAR™ TECHNOLOGY is a customizable solution that can be incorporated as an essential part of the pulp and papermaking process, regardless of your current solutions and conditions.



## Pulp Technologies

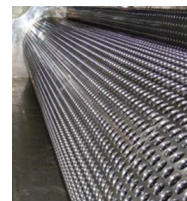
Our innovative, integrated pulp mill process aids improve your pulp and paper products and positively impact your operations. Nalco Water offers industry-leading platforms to improve pulp washing and pulp mill scale control, improving customer operations at optimized costs

- Brown Stock Wash Aids
- SCALE-GUARD™ PLUS
- Pulp Wash Intelligence



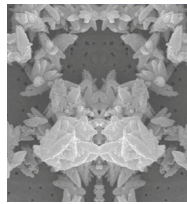
## Cleaning Technologies

Nalco Water's cleaning programs provide industry leading fabric conditioning, tailored on-machine and in-process boil-outs, and general and surface cleaning, which are all critical to optimize machine efficiency.



## FillerTEK™ Technology

Addressing the concerns of today's paper producer, FILLERTEK TECHNOLOGY delivers an increase in filler content of up to five units, while preserving the critical strength and optical attributes of the final sheet. This new technology effectively delivers cost-efficiency to paper producers by allowing them to utilize less expensive raw materials.



## 3D TRASAR™ and RBLI Technology for Boilers

Since changing conditions impact different parts of the boiler system — often very quickly — 3D TRASAR BOILER TECHNOLOGY AND RECOVERY BOILER LEAK INDICATION TECHNOLOGY (RBLI) are your most effective defense.



## Ecolab Global Intelligence Center

The Ecolab Global Intelligence Center (EGIC) is a network of intelligence facilities that delivers secure, personalized, data-driven, forward-looking insights to empower companies with the right information to achieve their operational, performance and sustainability goals.



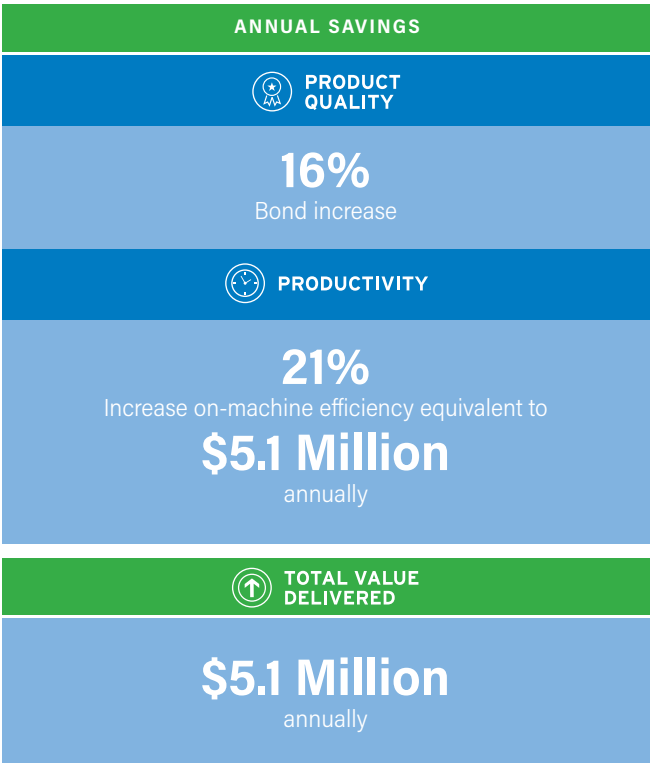
# Case Studies



## METRIX™ Dry Strength Technology

A mill struggled to produce a new folding carton grade due to heavier weights and furnish differences between linerboard and folding carton. The mill frequently rejected more than 50 percent of the production run due to internal bond failure, smoothness, and caliper concerns.

Nalco Water recommended spraying METRIX™ dry strength chemistry on the folding carton grades to enhance bond stability. Spraying METRIX 64170 before the secondary headbox provided the most efficient and significant impact on carton strength, greatly minimizing off-quality rejects.



## Retention and Drainage Program

A board and packaging manufacturer was looking to reduce downtime, improve runnability and increase productivity. The mill approached Nalco Water to help identify and improve operations on a machine that was experiencing downtime due to deposition and breaks.

Nalco Water experts evaluated the customer's challenges and proposed a solution to replace the existing competitive program: The Nalco Water 1T60 program combined with PARETO™ Mixing Technology. PARETO enabled the customer to move the application point from pre-screen to post-screen feed locations, resulting in improved drainage, optimized costs, and increased uptime.

### ANNUAL SAVINGS

#### COSTS

TCO

**\$299,536**

#### PRODUCTIVITY

Increased profits of

**\$589,536**

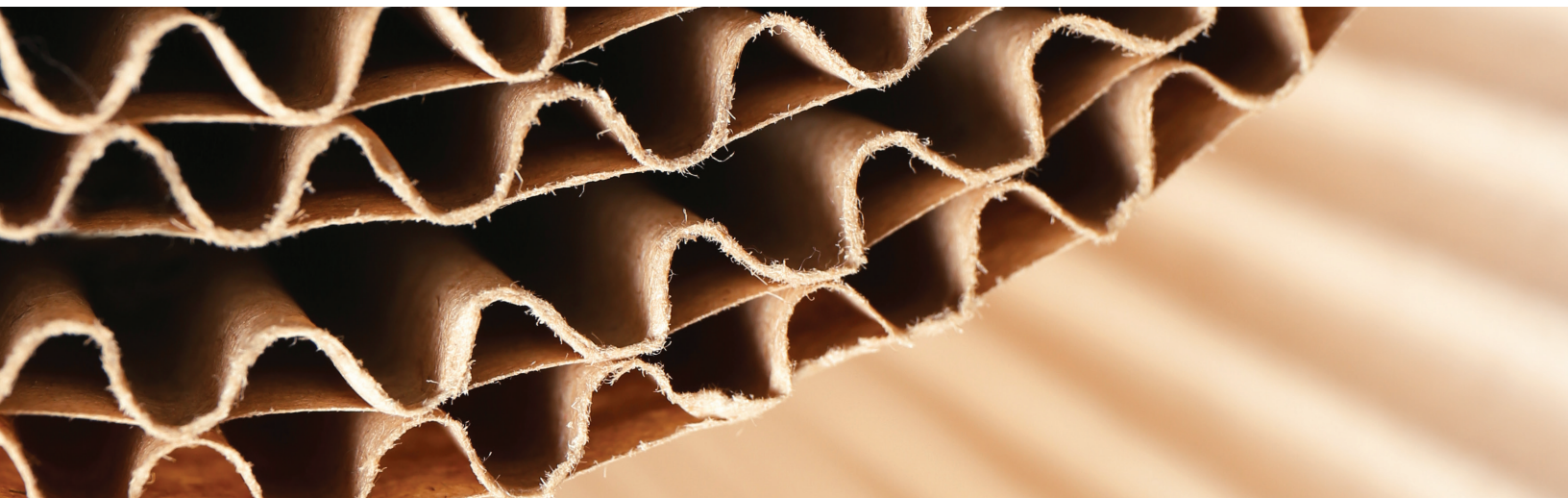
#### TOTAL VALUE DELIVERED

**\$480,000**

Saved per year

ROI of 103%





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