DORNER®
By Columbus McKinnon

5 Methods

for Improving Pharmaceutical Processing Through Conveyance

Accuracy, Sanitation, Quality, Automation & Flexibility

The global pharmaceutical market has increased by over 1 trillion U.S. dollars over the past 20 years. Revolutionizing how those products are produced, packaged, and distributed has been critical to the growth over that time.

The revolution has spearheaded an in-depth understanding of the uniqueness of the life sciences industry and its challenges. Understanding these intricacies throughout the production process makes engineering manufacturing lines with conveyors, automation, and other improvements much easier.

Most of the challenges in the production process stem from the industry's uniqueness such as: sanitary and safety requirements, dynamic production diversity, and product diversity combine to create potential headaches for production. Recognizing these challenges is one thing but managing them is another.

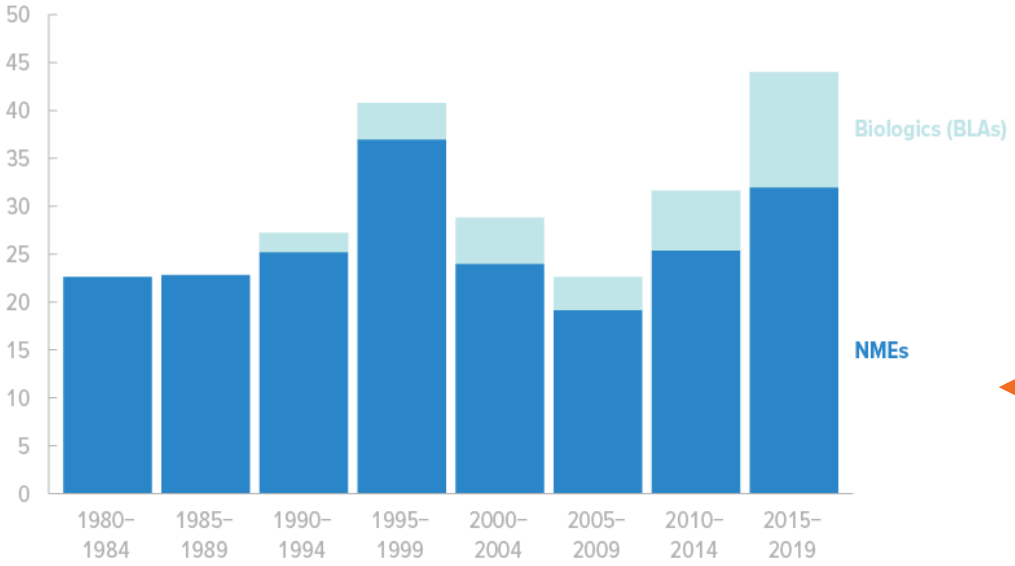
Included in this eBook

1. Focus of Improving Accuracy Throughout the Products Journey

"How fast, precise, and cost-effective can we produce, package, and fulfill our products?" will be the most critical question any high level-executive asks when designing their production lines. Of course, all these measures are calculated based on numerous factors, but precision can often be the breaking point for a product's success.

In today's pharmaceutical environment, the breadth of consumer products has increased tremendously. On average, the Food and Drug Administration (FDA) approved 38 new drugs per year from 2010 through 2019 (with a peak of 59 in 2018), which is 60 percent more than the yearly average over the previous decade. This increase in production has pushed capacity limits and has created a maze of multi-line warehouses making drugs and other pharmaceutical products in record amounts to keep up with the demand.

The FDA approved 60% more drugs between 2010 and 2019 than in previous decades.



BLA = biologic license application
NME = new molecular entity

Image source: cbo.gov 2021

Maintaining Multiple Lines of Packaging & Labeling

Producing a high quantity and variety of pharmaceutical products can be high risk. According to a study by the Institute of Medicine, 33% of all medical errors come from labeling and packaging issues, and 30% result in fatalities. Ensuring proper packaging containing correct product is critical to customer safety and maintaining a quality reputation. An intuitive solution ensures accurate product routing to their respective labeling stations. Conveyor solutions can utilize diverting and merging technology that gets instantaneous directions from RFID and photo-eye sensors to identify the product and move it to the correct destination. This technology maintains throughput expectations while keeping product labeling accuracy at the highest standards.

The life science industry is investing in automation and precision conveyors to help maximize its throughput while managing a diverse product portfolio. The diversity of the pharmaceutical production is not just the breadth of products, but the packaging and labeling required for each country that the product ships to.

33% of all medical errors come from labeling and packaging issues.

2. Strict Compliance with Regulatory Standards

Conveyors play a crucial role in the pharmaceutical industry, facilitating the movement of materials and products throughout the production, packaging, and fulfillment processes. However, due to the sensitive nature of pharmaceutical products, strict compliance with regulatory standards is imperative to ensure product safety, efficacy, and quality. Therefore, conveyors used in pharmaceutical production must meet several essential requirements to adhere to these stringent regulations.

First and foremost, conveyors must be designed and constructed with materials that meet pharmaceutical industry standards for each step in manufacturing and processing. In addition, these materials should be durable, non-reactive, and resistant to contamination. Stainless steel, for instance, is often preferred in handling raw materials and during the manufacturing process due to its corrosion resistance and ease of cleaning, which helps maintain sterility and prevent cross-contamination of pharmaceutical products often running on the same lines.

Ensuring Hygienic Conveyance

Another critical aspect is the design of the conveyor system. It should be hygienic and easy to clean to prevent the accumulation of debris, microbial growth, or other contaminants. Materials, coatings, and belting must be FDA approved and designed to minimize the shedding of particles during operation. The conveyor belts must also run clean and true to minimize particle generation and the potential for product contamination.

Pharmaceutical production environments require precise control over temperature, humidity, and airflow. Therefore, conveyors used in these settings often need to comply with cleanroom standards. Dorner's 1100 and 2200 series (ISO class 5) and ERT (ISO class 4) conveyors are verified for a variety of cleanroom applications.*

Additionally, operating in controlled environments, such as temperature, humidity, or harsh cleaning practices creates multiple challenges. Conveyor systems moving through controlled environments can be equipped with features such as stainless steel construction, high temperature belting, or air curtains or enclosures to hinder the ingress of contaminants.

*To verify cleanroom requirements, an unloaded base conveyor was tested and did not generate particulate that would be beyond the specified standards. However, the verification does not provide assurance that any or all applications will meet this requirement. Application testing is recommended to ensure cleanroom standards are being met. Dorner takes no responsibility in the cleanroom performance of the final conveyor or application.

Product & Employee Safety

Pharmaceutical production, packaging, and fulfillment conveyors must also incorporate safety features to protect both products and personnel. These safety features include emergency stop buttons, guards, interlocks, and safety sensors to prevent accidents, minimize hazards, and ensure operator safety.

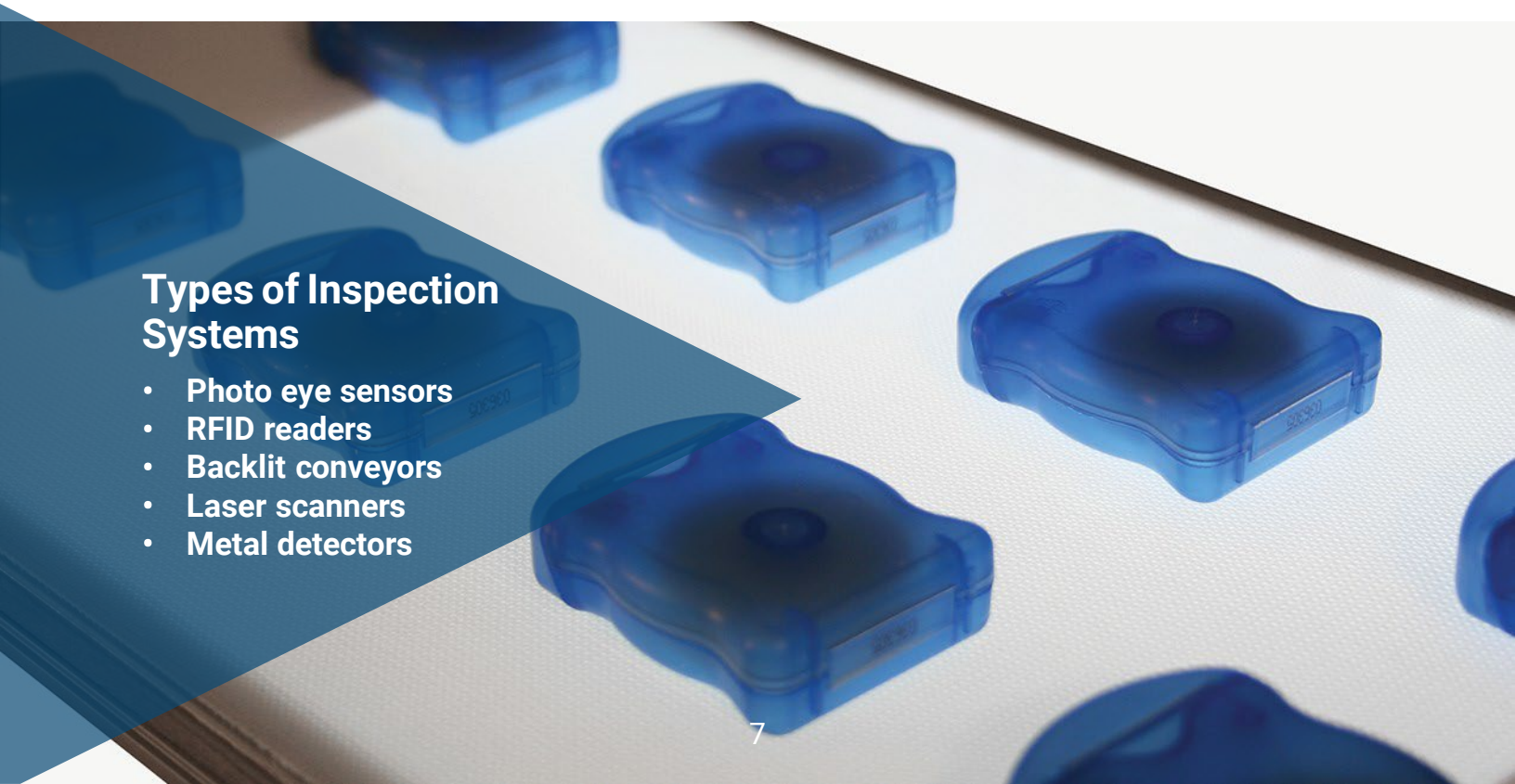
To meet regulatory compliance, pharmaceutical companies often work closely with conveyor manufacturers specializing in designing systems specifically for the industry. These manufacturers understand the specific requirements and standards, such as Good Manufacturing Practices (GMP), set forth by regulatory bodies like the U.S. Food and Drug Administration (FDA) or the European Medicines Agency (EMA). By collaborating with experienced conveyor manufacturers, pharmaceutical companies can ensure that their conveyor systems meet all necessary regulatory standards and contribute to the safe and efficient production, packaging, and fulfillment of pharmaceutical products.

3. Integration of Inspection Systems

In pharmaceutical conveyor applications, the integration of vision systems is paramount for quality control and inspection. In addition, vision systems are critical in ensuring the highest product quality standards and adherence to regulatory requirements within the pharmaceutical manufacturing industry. By seamlessly incorporating vision systems into conveyor lines, manufacturers can achieve a range of vital functions that directly impact the overall integrity of pharmaceutical products.

One of the primary advantages of vision systems in conveyor applications is the ability to detect defects accurately. With the advanced imaging capabilities of vision systems, even the most minute imperfections, such as irregular shapes, discolorations, or foreign particles, can be swiftly identified. By promptly identifying and diverting these defective items from the production line, pharmaceutical manufacturers can prevent compromised products from reaching the market, thus safeguarding patient health and upholding their brand reputation.

Furthermore, vision systems integrated into conveyor lines enable the verification of label accuracy. Pharmaceutical products often require precise labeling with critical information such as dosage instructions, expiration dates, and barcodes. By employing high-resolution cameras, vision systems can read, interpret, and validate the knowledge on labels in real-time. As a result, cameras ensure that each product is correctly labeled, reducing the risk of medication errors, and facilitating traceability throughout the supply chain.



Types of Inspection Systems

- **Photo eye sensors**
- **RFID readers**
- **Backlit conveyors**
- **Laser scanners**
- **Metal detectors**

Precise Product Packaging

Proper packaging and sealing are crucial in pharmaceutical manufacturing, as they contribute to product integrity, shelf life, and tamper-evident properties. Vision systems are pivotal in ensuring that packaging and sealing processes execute flawlessly. By monitoring the conveyor line, vision systems can inspect the packaging integrity, detect improper seals, or identify packaging errors, such as incorrect lot numbers or expiration dates. This level of scrutiny helps manufacturers maintain the highest standards of packaging quality and compliance, mitigating the risk of product recalls and enhancing patient safety.

Dorner's conveyors seamlessly integrate with vision systems, allowing real-time monitoring and automated rejection of faulty products. This integration minimizes human error as the reliance on manual inspection reduces. In addition, the continuous monitoring and swift response provided by vision systems integrated with Dorner's conveyors ensure that defective or non-compliant products are quickly identified and removed from the production line. Monitoring from the vision system enhances overall product quality and significantly improves operational efficiency by reducing the need for manual intervention and rework.

Vision systems integrated into pharmaceutical conveyor applications offer a multitude of benefits. From detecting defects and verifying label accuracy to ensuring proper packaging and sealing, vision systems play a vital role in maintaining product quality, compliance, and patient safety. Dorner's conveyors, designed with seamless integration in mind, provide a reliable platform for harnessing the power of vision systems, enabling pharmaceutical manufacturers to minimize human error, enhance overall product quality, and meet the rigorous demands of the industry.

4. Gentle Product Handling

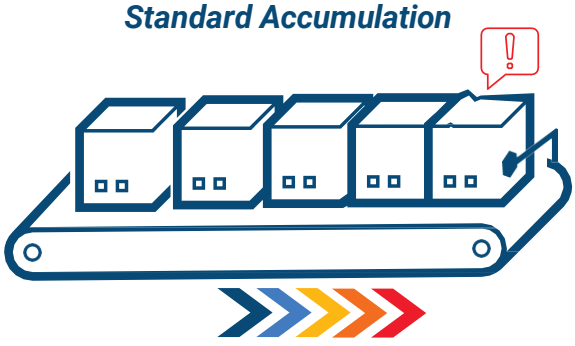
In the pharmaceutical manufacturing industry, product integrity is of utmost importance. Pharmaceuticals can be sensitive to various factors such as vibration, impact, or excessive handling, which can compromise their quality, efficacy, or even render them unusable. Therefore, managing the uniqueness of the industry requires conveyance solutions that prioritize gentle product handling.

Dorner's conveyors are meticulously designed to address the specific needs of pharmaceutical products. They employ various features and technologies that minimize product damage and ensure safe transportation throughout the production and packaging processes.

No back pressure accumulation conveyors and tables play a crucial role in ensuring gentle product handling in pharmaceutical applications. These advanced systems are designed to minimize the risk of product damage, especially for delicate pharmaceutical items.

By employing sophisticated technology, such as precision sensors and variable speed controls, these conveyors and tables enable smooth and controlled movement of products, preventing excessive pressure or jostling during transportation and accumulation.

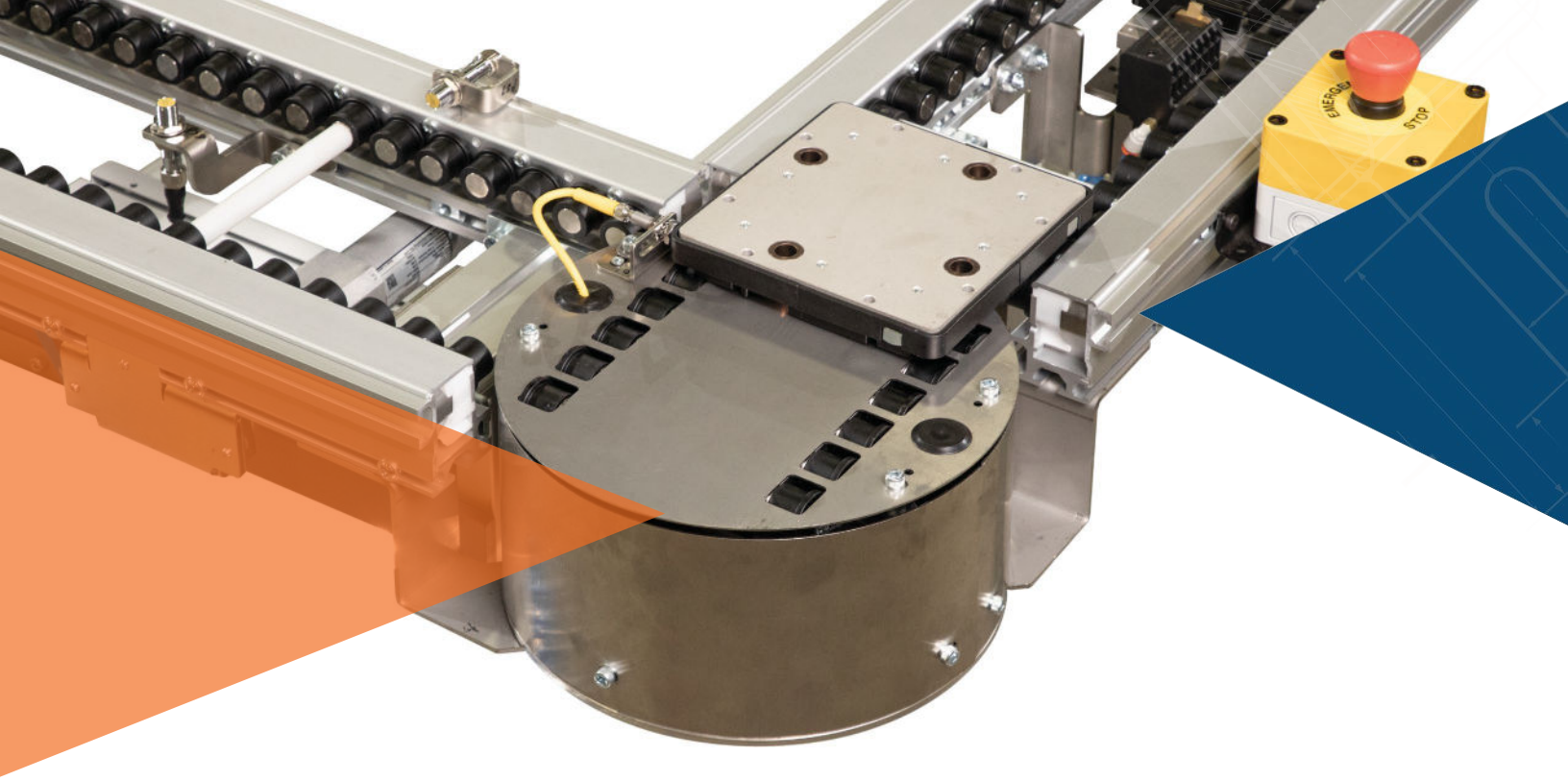
Standard Accumulation



Back pressure builds from product weight leading to higher risk of damage

No Back Pressure Accumulation

Separate accumulation zones allow product to accumulate without pressure from down the line.



Low Fiction Belting & Seamless Transfers

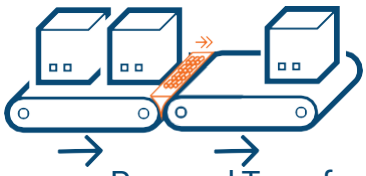
One key offering of gentle product handling is the use of low-friction belts. These belts are carefully chosen to minimize friction and eliminate any potential scratching or abrasion that could occur during product transfer in bulk pill or bottle handling operations. By reducing friction, the conveyor system ensures a smooth and gentle movement of pharmaceutical items along the production line.

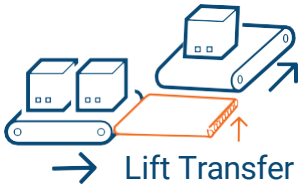
Adjustable speeds are another crucial feature in Dorner's conveyors. Different pharmaceutical products may require specific handling speeds to prevent damage. With adjustable speed controls, operators can precisely set the conveyor's speed to match the requirements of the product being transported. This allows for careful handling, especially when dealing with delicate items that may be prone to breakage or other forms of damage.

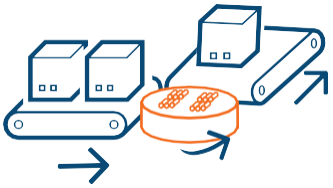
Customizable transfer mechanisms also play a significant role in gentle product handling. Dorner's conveyors offer flexible transfer options, such as controlled drops, precision placement, or specialized guides, to ensure that pharmaceutical items are smoothly transferred between conveyor sections or into packaging equipment. These transfer mechanisms are designed to minimize any jarring movements or sudden impacts that could harm the products.


90° Transfer


In-line Transfer


Powered Transfer


Lift Transfer

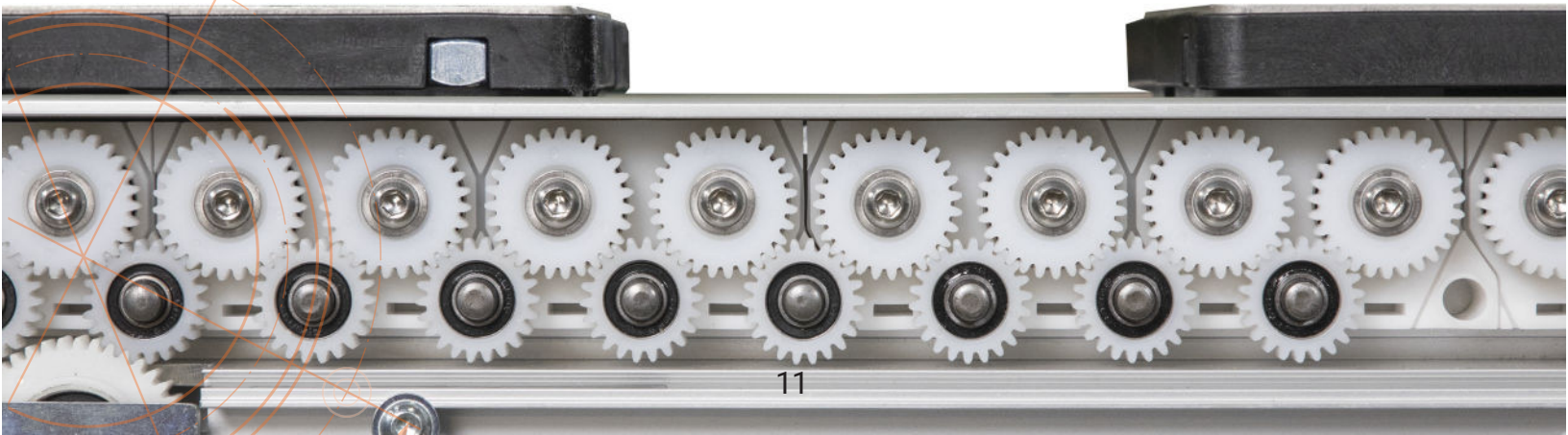

Rotate Transfer

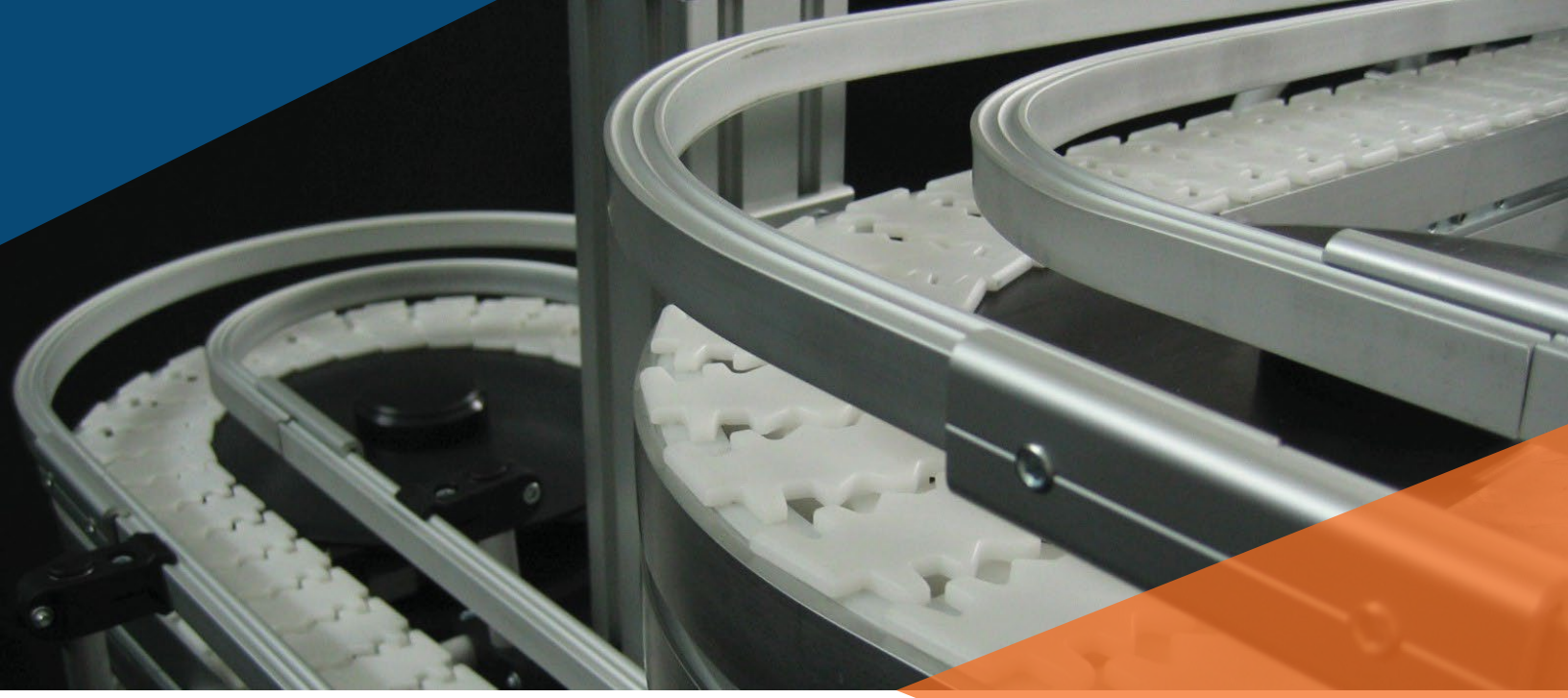
Pallet Movement Solutions

For precision movement, the Edge Roller Technology (ERT) conveyors are perfect for vials, syringes, and other fragile pharmaceutical productions. The ERT has pneumatic stops that ensure easy stops during accumulation and inspection stations.

Furthermore, Dorner's conveyors can be integrated with additional features like cushioned pneumatic stops, diverters, or adjustable accumulation zones. These features enable controlled and gentle handling during pauses or transitions, preventing any unnecessary stress on the pharmaceutical products.

By prioritizing gentle product handling, Dorner's conveyors help pharmaceutical manufacturers reduce the risk of product damage or degradation, ensuring that the medications retain their quality and efficacy. This attention to detail not only enhances product integrity but also minimizes waste and improves overall operational efficiency within the pharmaceutical manufacturing process.

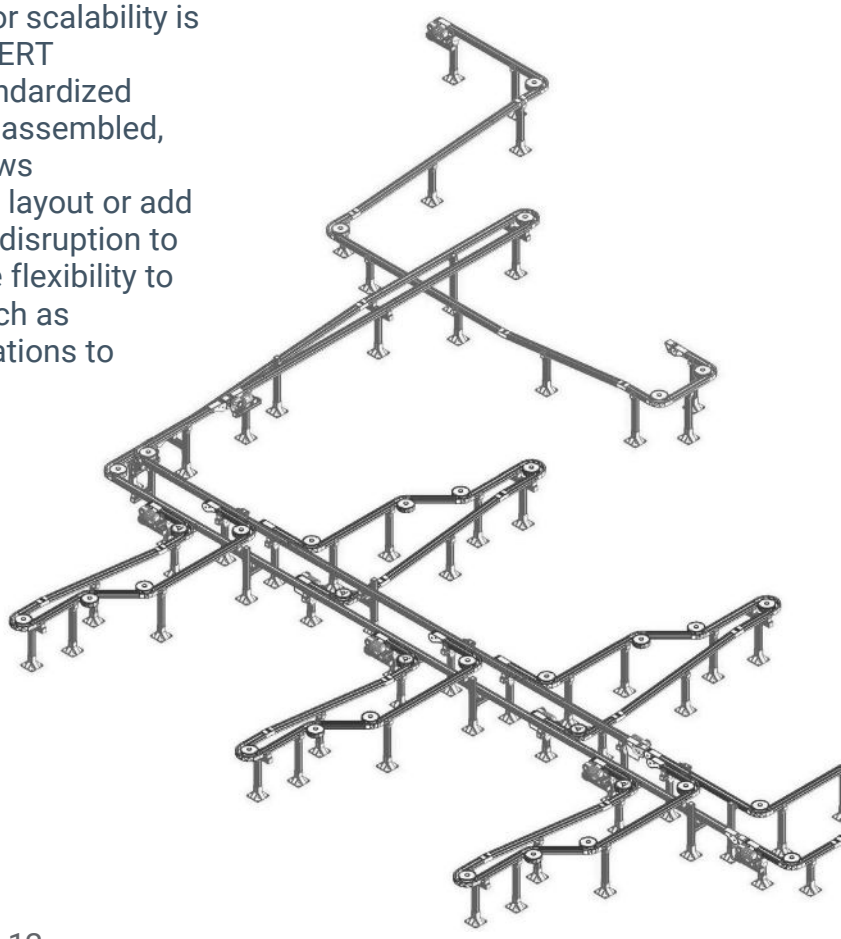




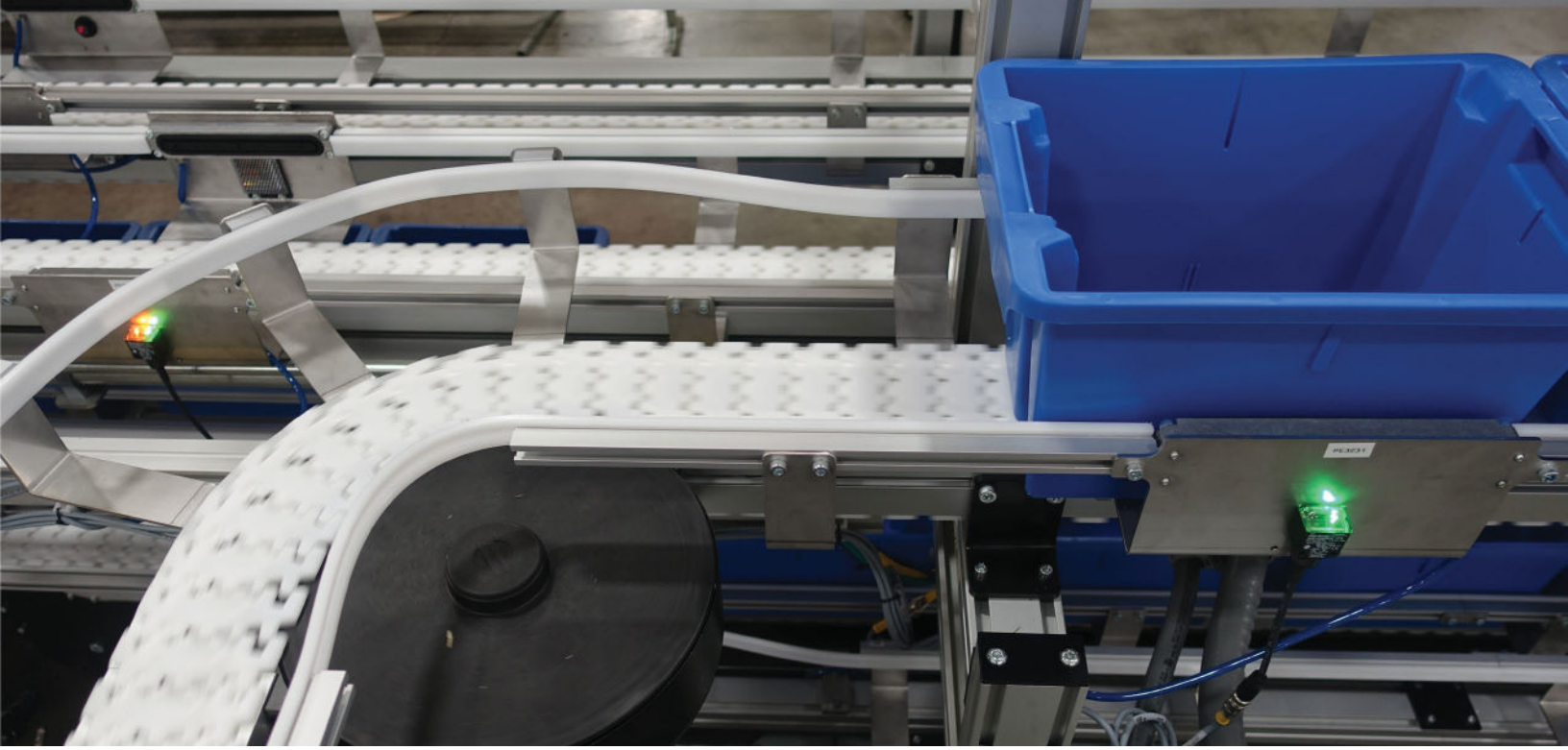
5. Flexibility & Scalability

The ability to adapt to changing demands is crucial in the fast-paced and ever-evolving pharmaceutical manufacturing industry. Dorner's conveyors provide the necessary adaptability and scalability to meet the dynamic needs of pharmaceutical manufacturers.

One of the key features that enable flexibility for scalability is the modular design of Dorner's FlexMove and ERT conveyors. These conveyors are built with standardized components that can be easily assembled, disassembled, and reconfigured. This modular approach allows manufacturers to modify the conveyor system layout or add new sections without significant downtime or disruption to ongoing operations. In addition, it provides the flexibility to accommodate changes in production flow, such as introducing new product formulations or alterations to packaging sizes.



Moreover, all of Dorner's conveyor lines offer customizable configurations to suit specific manufacturing requirements. Manufacturers can choose from various conveyor sizes, belt types, and accessories to create a tailored solution that aligns with their unique needs. This customization extends to the conveyor's control systems, allowing for seamless integration with existing production equipment and facilitating efficient communication between different components of the manufacturing process.



Adaptation to Market Demands

The ability to quickly reconfigure and expand the conveyor system enables pharmaceutical manufacturers to manage variations in their product lines efficiently. As a result, they can swiftly adapt to shifts in market demands, respond to new regulatory requirements, or accommodate changes in production volumes.

By offering flexibility for scalability, Dorner's conveyors empower pharmaceutical manufacturers to optimize their operations. As a result, they can efficiently utilize their production space, reduce the need for extensive retooling or investment in new equipment, and streamline their manufacturing process. This adaptability helps manufacturers stay agile in a competitive industry, ensuring they can meet market demands effectively and maintain high-quality standards throughout their operations.

Achieve Efficient Pharmaceutical Production & Fulfillment with Dorner

Pharmaceutical conveyor solutions need strict compliance with regulatory standards, integration of vision systems, gentle product handling, and flexibility for scalability to thrive in the uniqueness of the pharmaceutical manufacturing industry through conveyance.

Dorner's pharmaceutical conveyors offer a range of features specifically designed to meet the unique requirements of the pharmaceutical industry. With their sanitary design, clean-in-place capability, and contamination control features, such as sealed edges and smooth surfaces, these conveyors ensure compliance with strict hygiene standards. The integration of vision systems enables automated inspection and quality control, enhancing product integrity and traceability.

Additionally, Dorner's conveyors prioritize gentle product handling through low-friction belts, adjustable speeds, and customizable transfer mechanisms, safeguarding pharmaceutical goods from damage. With their flexibility and modularity, these conveyors allow for easy reconfiguration and expansion to efficiently manage variations in product lines.

To enhance your pharmaceutical manufacturing operations, explore the range of Dorner's pharmaceutical conveyors, such as the Sanitary AquaPruf® Series or FlexMove Series, and experience the benefits of tailored solutions designed to optimize productivity, quality, and compliance. Take the next step towards streamlining your pharmaceutical production and packaging processes by contacting Dorner today.

Ready to improve your pharmaceutical manufacturing process?

Contact us to learn more about the pharmaceutical conveyors system that's right for you.

Get in Touch!

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Dorner Difference

Whichever conveyor system you choose, you will receive:

- A 10-year warranty
- Quick and easy installation
- Reliable customer service
- Aftermarket support