

Today's advanced plastic chain conveyors, such as Bosch Rexroth's VarioFlow plus system, provide the modular flexibility and quiet, efficient transport today's packaging lines require to maximize throughput and productivity.



Choosing Flexible Conveyor Systems for Ever-Changing Packaging Lines

When it comes to the packaging industry, constant change is a feature, not a bug. With continuously shifting consumer preferences, new products entering the market and evolving innovations, the packaging industry must meet new demands on a regular basis. Whether a packaging line is bottling beverages, boxing soap or wrapping battery packs, consumer packaged goods operations need agility to navigate an unpredictable market landscape.

With the addition of unanticipated situational disruptions to demand, such as the dramatic changes in consumer behavior seen during the COVID-19 pandemic, it's clear that packaging operations need flexible production platforms. They must be able to efficiently retool and reconfigure packaging workflows with minimal downtime.

To maintain an agile, modular packaging line, having the right transport technology is essential. Today's modular plastic chain conveyor systems, like Bosch Rexroth's VarioFlow *plus*, incorporate design and technology that increase flexibility with more interchangeable conveyor modules. They also meet present-day needs with larger and

heavier payload capacity, more durable parts and materials for increased reliability and the ability to integrate with Industry 4.0 technologies for increased uptime.

As the industry continues to evolve, modern plastic chain conveyor systems are changing with it. Choosing the right system that delivers the flexibility you need is critical for long-term success when implementing a new packaging line or upgrading existing facilities. Understanding what the latest generation of plastic chain transport systems offers can help packaging lines make the best choice to improve productivity and minimize downtime.



New materials and multiple plastic chain options like those offered by VarioFlow plus give packaging line operations options as they design solutions for their unique product and operational requirements.

WHY CONVEYORS ARE BECOMING CENTRAL TO PACKAGING EFFICIENCY

At one time, conveying systems were seen as one of the last considerations when designing and equipping a packaging line. It was relatively common for the design and layout to be focused on packaging machinery, with conveyors added only to move products from one station to the next. However, today's generation of modular chain conveyor systems from Bosch Rexroth have demonstrated the central role and importance of a high-quality, high-performance transport system in efficient, well-organized packaging, assembly and material handling applications. Modern chain conveyor systems function to sustain uptime and productivity to maximize the return on capital investment in the entire line.

One of the most valuable benefits of Bosch Rexroth's plastic chain conveyor VarioFlow *plus* is modularity. Different components can easily be combined into optimal layouts and flow for a given production operation, and they can be modified and reconfigured to respond to changing product needs as market and consumer tastes evolve.

Modularity and flexibility are two of the most important considerations to assess when choosing a chain conveyor system. Modular chain conveyors like VarioFlow can also relieve bottlenecks and other product flow challenges via line buffering and accumulators. And they can support rapid changes in process speeds, infeed/outfeed demands, production disturbances and changeovers for product dimension changes or labeling updates.

Engineered to maximize modularity, Bosch Rexroth conveyors feature components that can be easily combined for custom layouts. These components can include the flexible chain, guide components, curves, motors and gearboxes. Variable configurations can accommodate different package sizes and shapes and different climbs and descent rates when moving product from one level to another on a line. Another important factor to consider is the quality of the plastic chain itself. A stable chain that can handle high tensile forces (VarioFlow *plus* supports up to 1250 N) at high speed can save system cost by reducing the number of drives needed over a given length.



Standardized modular components such as diverters, accumulators, stop units and curve units make it easy to adjust and reconfigure transport layouts based on constantly changing consumer preferences and packaging formats.

MOVING INTO THE FUTURE WITH IMPROVED PERFORMANCE

As a leading chain conveyor manufacturer, Bosch Rexroth has continued to invest in transport systems, incorporating advances in existing features as well as new capabilities to provide more versatile functionality and performance for packaging lines. Improved core components of Bosch Rexroth conveyors allow components across different models to be interchangeable.

With the introduction of common profile design, common slide rail design and a more uniform chain design, one VarioFlow conveyor system can now handle, under normal transport, up to 250 kilograms (kg) in a single line. This allows packaging operations to create much longer straight runs if they need to, based on their plant's footprint and specific production requirements. However, with the introduction of gear motors with an IE3 efficiency rating in VarioFlow conveyors, these longer runs remain energy efficient. The motors use the same amount of power that was previously used for shorter lengths; the newer motor-gearbox combinations can also be tuned to boost the power output so that heavier loads can be handled on the same conveyor.

These gear motors also offer an expanded range of throughput speeds — Bosch Rexroth supports throughput rates from three meters per minute up to 60 meters per minute for some very fast packaging applications, such as pill bottle filling or blister pack sealing. There have also been advances in plastic chain design to accommodate a broader range of material weights, configurations and transport paths. In one case, a manufacturer needed to move lightweight metal and plastic product lids up multiple inclines. Bosch Rexroth provided plastic chain with a flocked surface that provided just enough friction to hold the product in place as it moved upward without damaging the lids.

Improvements in Bosch Rexroth's plastic chain design and materials, combined with refinements in the slide rail design, have significantly improved the coefficient of friction for the entire system. This provides several key benefits: conveyor moving parts last much longer and require less frequent maintenance intervals, the overall system runs more quietly and the reduced friction also contributes to improved overall energy efficiency.

Modern conveyors offer a simple yet creative platform to help packaging companies guide products through specialized motions at relatively high throughput speeds without the use of complex handling machines. In some cases, a conveyor system can incorporate a guide rail positioned at 90 degrees to the flow of product, at just the

right angle to change the orientation of the product. Or, if the package needs to be flipped over, it can be dropped off a ledge from one conveyor to the next to accomplish the move. Using these methods depends on several factors, such as the product being conveyed, the shape and dimensions of the package, how stable it is in terms of center of gravity and how fragile the contents may be.

THE BACKBONE OF INDUSTRY 4.0

Many leading packaging operations are making large-scale investments in Industry 4.0 technology and controls, seeking to capture, analyze and leverage real-time data about a host of automation operations to continuously fine-tune and improve their operations. In many ways, chain conveyors can be viewed as the “backbone” of any successful i4.0 system, since the conveyor transports the product from start to finish in the packaging flow. Companies are beginning to invest in “smart conveyors,” using sensors or RFID tags to precisely track the flow of every item through the system.

There have also been significant moves to replace pneumatic actuation of diverters and other positioning devices on some conveyor platforms with electric actuation, which can incorporate I/O sensor and control data that connect with automation PLCs for a complete picture of the conveyor's operating conditions. As a leading provider of both conveyor systems and Industry 4.0 solutions, Bosch Rexroth is able to offer complete conveyor solutions with IoT integration. Their conveyors are engineered to more easily integrate into electronic production floor Kanban systems so that the rest of the line and the plant know how “the backbone” is operating. Combining this data with AI-based real-time analytics will enable packagers to rapidly find an issue on a line and resolve it with as little human intervention as possible, helping lower total cost of ownership and improve return on investment.

FINDING THE RIGHT CONVEYOR SYSTEM

Modular plastic chain conveyors are high-performance, versatile components of any modern packaging line, offering the reliable operation and flexible configurability today's packaging operations need to meet constantly changing marketplace and consumer preferences. Whether a company is installing a new packaging line, considering an upgrade or significantly redesigning existing facilities, Bosch Rexroth can make the process easy with expert engineering support and online design and configuration tools. By engaging with a conveyor expert from Bosch Rexroth early, they can assess the unique space and footprint conditions, as well as the packaging processes, throughput and quality control requirements throughout your operation.



Leading conveyor manufacturers support their products with state-of-the-art digital design and configuration tools like Bosch Rexroth MTpro software, which enables product selection, configuration and ordering from a single tool.

As a global leader in conveyor technology, Bosch Rexroth can provide the conveying technology, expert guidance and global support for packaging lines in any location to help ensure all of your lines operate with the efficiency, throughput and reliability needed to meet all production goals.

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