

## ***Choosing the Right Accumulation Solution for your Application***



Learn about best practices and capabilities of accumulating conveyor and machine solutions, and considerations for choosing best fit by application.

### **Planning for Accumulation**

Accumulation is required in high speed production lines to make sure that the generating unit continues to run during malfunctions of downstream equipment. Simply stated, if the generating unit is idle, the production is lost forever. Further, a certain amount of products or packages can be damaged during the stop and start cycles. Often manpower is utilized to unload product and then re-load the product back into the production flow. A reliable accumulation system results in more production, less waste and decreased manpower.

This article is an overview of different types of conveyor systems and machine solutions that provide accumulation. Criteria is also examined for each solution, including:

- Type of Product: Round, non-round, packages, cases
- Sequence: FIFO (First-in, First-Out), FILO (First-in, Last-Out) and random
- Cost: \$ = less than \$50,000,  
\$\$ = \$50,000 - \$100,000 and  
\$\$\$ = over \$100,000
- Controls: Simple or Complex
- Footprint: Small, medium, large
- Capacity: Small, medium, large
- Back Pressure: Zero, reduced or normal pressure

## Accumulation Solutions: A Comparison of Packaging Line Accumulation Equipment and Capabilities

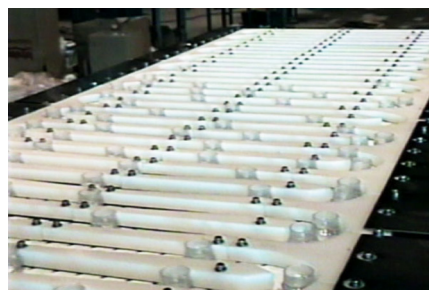
	PRODUCTS				SEQUENCE			COST			CONTROLS		FOOTPRINT			CAPACITY			BACK PRESSURE		
	Round	Non-Round	Package	Case	FIFO	FILO	Random	\$	\$\$	\$\$\$	Simple	Complex	Small	Medium	Large	Small	Medium	Large	Zero	Reduced	Normal
<b>CONVEYORS</b>																					
Tabletop	●	●	●	●	●		●			●		●	●	●	●	●	●				●
Mass Flow	●					●	●			●		●	●	●	●	●	●				●
Serpentine Conveyor	●	●	●	●			●			●		●	●	●	●	●	●				●
Serpentine Table	●				●					●		●	●	●	●	●	●				●
LBP Chain	●	●	●	●	●					●		●	●	●	●	●	●			●	
Roller Top			●	●							●	●	●	●	●	●	●			●	
Zero Pressure Lift			●	●	●						●	●	●	●	●	●	●	●			
Multi-Lane	●	●	●		●						●		●	●	●	●	●				●
<b>EQUIPMENT</b>																					
Re-Flow Table	●	●				●	●			●		●	●	●	●	●	●			●	
Bi-Di Table	●	●			●					●	●		●	●	●	●	●			●	
Flex Flow	●	●	●		●						●		●	●	●	●	●	●			
Alpine	●	●	●		●					●		●	●	●	●	●	●				●
Vertical Accumulator*			●	●	●						●	●	●	●	●	●	●			●	
Rolco Serpentine*	●		●	●	●	●				●		●	●	●	●	●	●			●	
Rolco Multi-Level*			●	●	●	●				●		●	●	●	●	●	●			●	

\* While the equipment provides zero pressure in the machine, back pressure is required for staging.

There are three main considerations when researching an accumulation solution.

1. Consider the product weight, shape and packaging. Is the product stable when conveyed? Can the product handle back pressure to accumulate? The type of product may be the defining factor in the best accumulation choice for the application.
2. Determine the area available for the equipment. In some production floor layouts, there may be conveyors overhead which would eliminate most of the vertical accumulation solutions. Similarly, the floor layout may be already crowded and the only way to accumulate is to go up.
3. Calculate the amount of accumulation time needed. This will affect either the footprint or the height of the equipment, depending on the type of equipment.

### Accumulation Conveyors



#### Serpentine Table

The Serpentine Table is also a single product wide accumulation system. The table design is more compact than serpentine conveyor.



## Accumulation Conveyors *Continued*



### **Multi-Lane Accumulation Bottle Handling**

Another example of a Multi-Lane system, this equipment uses pneumatic swing gates to deliver accumulated slugs of bottles downstream. These systems make excellent use of dense accumulation for the size of the footprint.



### **Multi-Lane Accumulation Package Handling**

This multi-lane accumulator uses a small roller LBP chain which alleviates back pressure to prevent package damage. The gates are controlled to deliver accumulated slugs of packages to different lines downstream.



### **Mass Flow Conveyors**

Round containers are suitable products to travel on mass flow in-line accumulation conveyors. The conveyor system accelerates or decelerates depending on the demand from downstream equipment. The width of the mat style belt determines the accumulation capacity. Individually controllable powered accumulation zones prevent buildup of excessive line pressure.



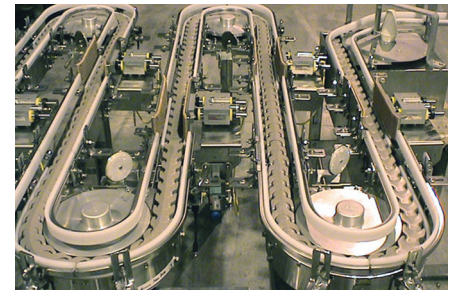
### **LBP or Roller Top Conveyor**

LBP (low back-pressure) and Roller Top Conveyors are a one product wide accumulation solution. The rollers in the chain relieve back-pressure. Typically, LBP chain is used to handle packages and Roller Top chain is designed for case handling.



### **Zero-Pressure Lift**

The zero-pressure lift is designed to lift individual or groups of product off the chain. It is possible to zone an entire conveyor length. It is best used for products that cannot handle impact. The controls are more complex because they involve pneumatic lifts



### **Serpentine Conveyor**

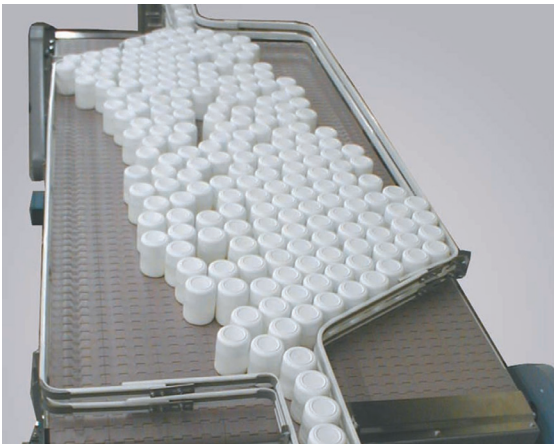
The Serpentine Conveyor is a single product wide accumulation solution that increases buffering capacity of the line. Like tabletop conveyor, it can be designed to handle round and non-round containers as well as packages.



### **Tabletop Chain Conveyors**

Tabletop chain conveyors are a single product flow accumulation solution. The accumulation occurs in the gaps between the products.

## Accumulating Machines



### *Re-Flow Accumulation Table*

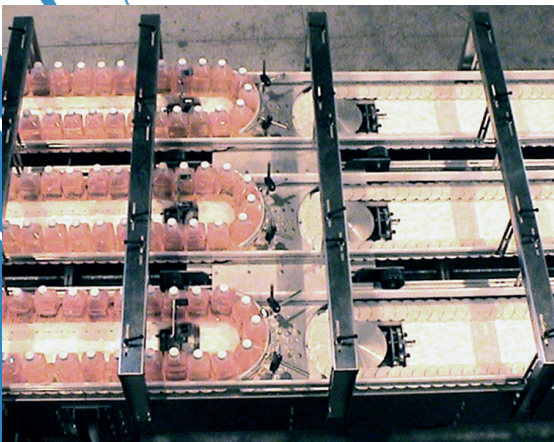
The Re-Flow Accumulation Table utilizes a recirculating design that relieves back pressure, allowing for smooth, jam-free single filing of products through the discharge. The footprint is relatively small compared to the accumulation table's storage capacity. This table is suitable for glass, PET and aluminum bottles or containers.



### *Bi-Directional Accumulation Table*

The Bi-Directional Accumulation Table is designed for right angle, randomly discharged accumulation. Featuring automatic cycling, a sweep bar can be added to the system to provide automatic and complete unloading of product.

When a line stoppage occurs, the table's belt is controlled to move at a right angle to the conveyor line, and begins loading. When downstream blockage is clear, the belt reverses for unloading.

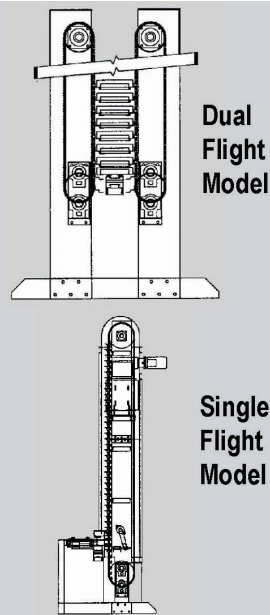
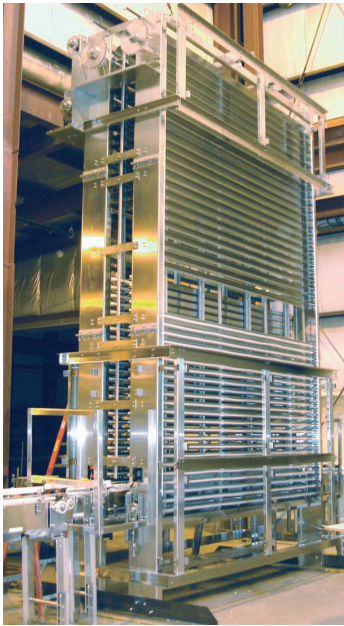


### *Flex Flow Accumulation Table*

The Flex Flow Accumulator is a first-in, first-out accumulation table. One of the main benefits of this type of accumulator is that it can accumulate fragile or non-round products and packages. A zero pressure solution, a single crescent top chain transports the product, preventing product damage and waste. Separate drives at the infeed and discharge locations provide a consistent flow and allow products to discharge at a different rate than received. The carriage moves to expand or contract the path on the Flex Flow Accumulator, to respond to fluxes in production.

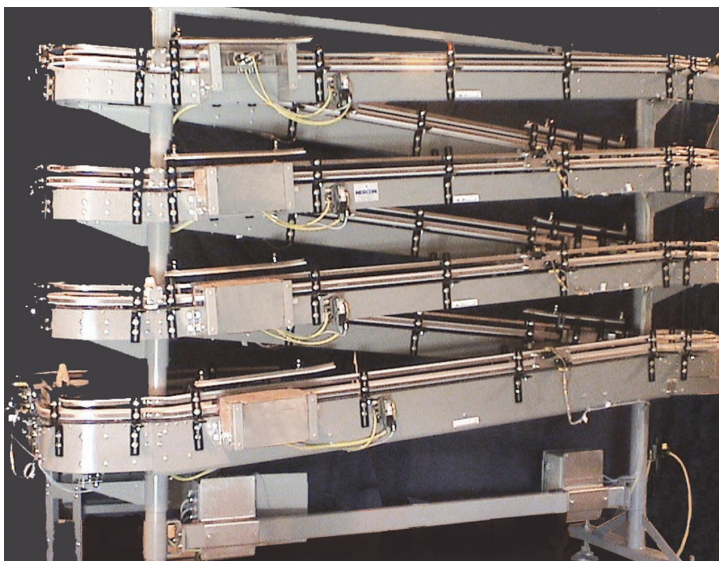


## Accumulating Machines *Continued*



### **Vertical Accumulator**

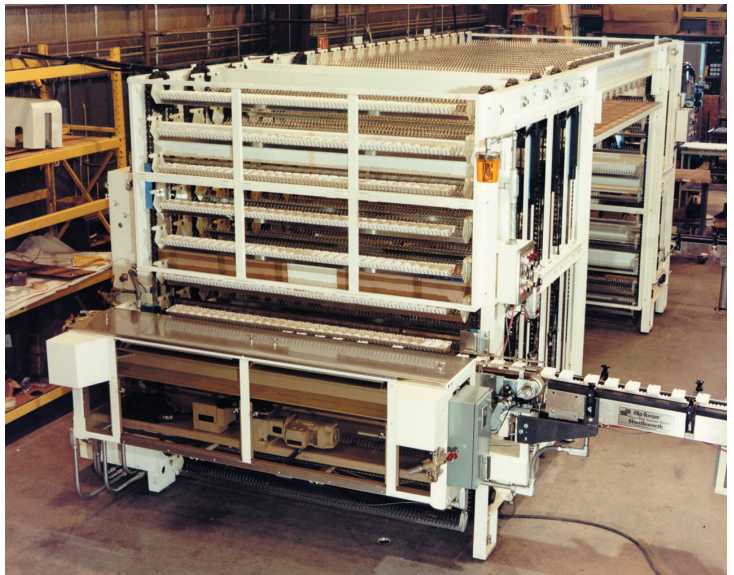
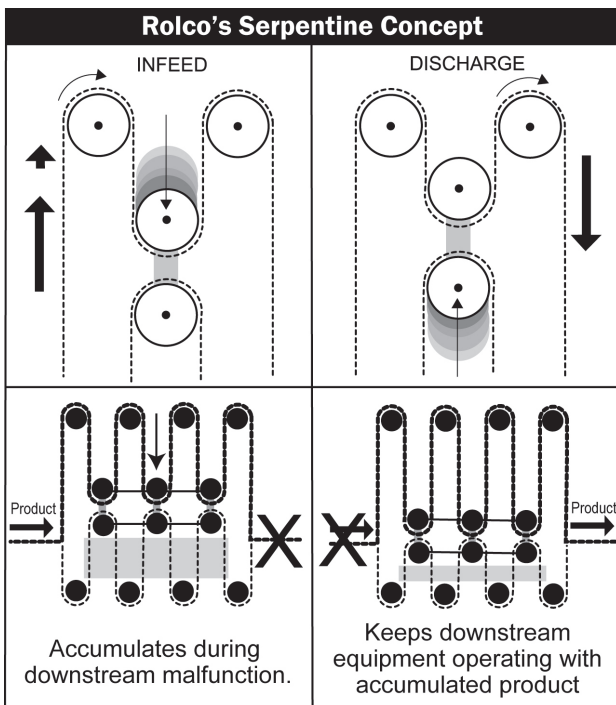
Offering FILO (First-in, Last-Out) accumulation, the Vertical Accumulator can be designed to accumulate in-line or as an off-line bypass, depending on the application. In normal operation, the product runs through or along side the accumulator. During downstream malfunctions, the product is grouped at the infeed location and these groups are indexed down and automatically loaded back onto the conveyor system. The Vertical Accumulator requires infeed and discharge conveyor lengths of one and a half times longer than the width of the accumulator. Storage capacity is determined by the flight width and vertical height. The Vertical Accumulator can be used in high volume applications, with 13-14 indexes per minute. The dual flight model is used for heavier products. The single flight model is used for lighter-weight products; both sides can be used for accumulation.



### **Alpine System**

Alpine Systems can be used as an elevator, a lowerator or an accumulation system. It is used when layout versatility is needed. Alpine systems can be designed to convey between floors, over aisles or overhead. They are also used for in-line processing such as warming or cooling. The Alpine system is a linear, one product wide solution that makes effective use of vertical space. It can handle rounds, non-rounds and packages as long as they are stable traveling on the slight incline.

## Accumulating Machines *Continued*



### ***Rolco's Serpentine Accumulator***

The Serpentine Accumulator is available in a first-in, first-out design or a first-in, last-out design. Both designs are engineered to use vertical space for storage and can be built to the available ceiling height.

The first-in, first-out Serpentine Accumulator allows the infeed of products at one location and the discharge of products at another location. This unit also allows the infeed and discharge to operate at the same time, and it also is engineered to discharge products faster than the infeed of the product.

In normal operation, product is delivered to the accumulator infeed, transferred into a product carrier, progressed through the system and discharged back into the production line, as required by the downstream equipment. If the downstream machine is not ready to accept product, the accumulator discharge does not operate. The infeed continues to operate, storing all of the production in the accumulator. The uni-slide continues to descend as the accumulator gets filled. As soon as the downstream machine is ready to accept product, the discharge operates at a faster rate than the infeed, gradually removing all of the accumulated product and getting back to a one for one with the upstream equipment.



## Accumulating Machines *Continued*



### ***Rolco's Multi-Level Storage & Distribution System***

Rolco's Multi-Level Storage/Distribution System maximizes floor space due to the vertical design. The unit can be designed as a first-in, first-out or a first-in, last-out delivery system. Change-over time between different cases sizes is non-existent. The Multi-Level Storage/Distribution System is simply interfaced with other equipment. A distinguishing feature of the system is that it can be used to condition products by installing it in a warming or cooling environment.



*Adding to the efficiency of the packaging line, a HMI (Human Machine Interface) panel allows for programming and automation of different recipes and package sizes, as well as machine and line monitoring.*

### ***Accumulation Control Panel***

While the right accumulation equipment increases the throughput of the entire production line, effective controls define the performance of the accumulation system. Accurately placed photo eyes sense upstream product staging, as well as downstream equipment status. Effectively programmed and reliable sensors can reduce the hard wire or Ethernet communication between upstream and downstream equipment. Operator Panel Views also add to the efficiency of an accumulator, by having the ability to immediately diagnose machine status. A sound controls package will take full advantage of production fluctuations and maintain a flawless interface with the rest of the equipment.

## Identifying the Parameters of the Accumulation System

The product information, area available and accumulation time must be taken into consideration when planning for an accumulation solution. Once the accumulation equipment type(s) are narrowed down, parameters need to be identified in order to confirm the final engineered accumulation solution.

Ranging from in-line accumulation conveyors to Rolco's unique Product Accumulators, Nercon has a great depth of accumulation solutions and experience to solve many types of production needs. Having engineered and manufactured systems for over thirty-five years, Nercon has the expertise to determine the best performing accumulation equipment for your packaging conveyor line.

<b>Top 10 Parameters of an Accumulation System CHECK-LIST</b>	
<b>1</b> Product Size Information Length, Width, Height, Shape and Weight	
<b>2</b> Define the conveyability of the product	
<b>3</b> Identify other products that will be accumulated and all product size variances, including future products	
<b>4</b> Product orientation requirements	
<b>5</b> Production rate of generating unit and packaging or down stream equipment	
<b>6</b> Accumulation time required	
<b>7</b> Infeed and discharge elevation	
<b>8</b> Ceiling height and available floor space (CAD drawing)	
<b>9</b> Electrical specifications	
<b>10</b> Mechanical Specifications	



600 S. Commercial St.  
Neenah, WI 54956  
844-293-2814

[www.nerconconveyors.com](http://www.nerconconveyors.com)