

A Case For:

# Developing An Effective Sortation System

To expedite delivery and maintain a high level of customer satisfaction, you need to push product through the shipping process rapidly and accurately. An increasing number of enterprises that handle a broad range of SKUs or packages are capitalizing on sortation technologies to meet their needs most effectively. Many organizations are amazed by the numerous options available to them that can exceed short and long term business objectives and provide valuable solutions to unique facilities and processes.

## SORTING OUT THE POSSIBILITIES

Sortation systems become increasingly essential in an environment where the product mix is complex. For example, retail, pharmaceutical, package delivery and mail have always required sortation. Today, manufacturers are also realizing this growing need as smaller lot sizes with broader product lines are much more commonplace.

### STEP 1 – ANALYZE YOUR NEEDS

There are two basic approaches to configuring a solution. The first is to view sortation as a process to add to operations. You can also view sortation as an essential component of your overall system specifically designed to meet your business objectives. The second approach is far superior, as it requires you to consider the entire context, such as all possible product mixes from all lines and factoring future needs into the equation.

### STEP 2 – EVALUATE THE ADVANTAGES

A sortation system includes multiple elements that must inter-operate: conveyors, product identification, product flow, and the sortation activity itself. Perform a complete system planning audit to determine your overall system specifications. Operational constraints requiring evaluation may include: Product weight; Carton/package size; cartons per minute; Operational noise ceiling; Aesthetics (e.g., avoidance of marring); Available site space and layout. A comprehensive system audit performed by a qualified system integrator will serve as the key to developing a successful, customized solution.

### STEP 3 – DETERMINE THE LEVEL OF AUTOMATION

Using your business requirements, you must now determine where your sortation needs fall on the continuum from semi-manual to full automation. Generally, the higher the need for consistent speed and accuracy, the more automation will appeal to you. Sortation automation should be considered when two or more of the following elements exist: Throughput: 3,600+ items per hour; Accuracy: 99.9%; Product damage: 1% or less; Efficiency: meet/exceed production rates; Resources: minimize human intervention.

### STEP 4 – SELECT THE PROPER EQUIPMENT AND CONTROLS

When automation is beneficial, it is best to consider the appropriate equipment and controls strategies at each of the three sortation stages: Induction, Sortation, and Aftersort.

#### STAGE 1: INDUCTION

The induction subsystem determines how goods reach the sortation stage and helps shape the overall approach. The following table presents some considerations to induction design.

Aspect	Example Technologies	Objective
Item Identification	Bar code; radio frequency (RFID); camera (computer vision)	Sort accuracy begins here
Item Infeed	Multiple conveyors into single; single line gap optimizer; singulator; cross-dock	Smooth transition from production or intake to sortation
Item Merging	Sawtooth (30° spurs feed takeaway line); Wide belt (2+ lines consolidated)	Reliable funneling of multiple lines to consolidated sortation stages to maximize efficiency and asset utilization
Item Gapping (space between items)	Speed changes: Braking, Acceleration, Deceleration	Accurate positioning for space between units and side-to-side alignment

## STAGE 2: SORTATION

The sortation subsystem includes a range of technologies. The table below lists key characteristics for the types most often used.

Sortation Type	CPM	Case Size L x W	Recommended Gap	No. of Diverts	Divert Angle Available	Speeds (Ft / Min.)	Recommended Inductions	Cost	Typical Applications**
Manual	5-15	***	24 in.	***	30-90°	N/A	Manual	Lowest	1, 2
Deflector	10-20	***	3-5 ft.	***	30° max	<120	BSSE*	Lower	1, 2
Right Angle Belt Transfer	10-30	***	24 in.	***	30-90°	120	BSSE*	Low	1, 2, 3
Pusher	10-35	24 in.	20 in.	***	90°	<120	BSSE*	Low	1, 2, 3
Puller	10-30	24 in.	24 in.	***	90°	<120	BSSE*	Low	1, 2, 3
Pop-up Wheel Diverter	80	9-42 in. x 6-27 in.	18 in.	1-10	30°	150-300	BSSE* BSME BSME-HS	Low Med High	4
HK Whispersort Sliding Shoe	230	18 in.	12 in.	1-128	20-30°	200-600	VFD Servo	High	5, 6
Tilt Tray	80-200+	2-30 in.	N/A	1-100 +	90°	450	Servo	Highest	5, 6
Cross Belt Sorter	200+	2-30 in.	N/A	Avg. 100	45-90°	400-600	Servo	Highest	5, 6

\* BSSE = Brake spacer; BSME = Brake Meter; BSME-HS = High-speed Brake Meter

\*\* Applications. 1 = Low speed distribution; 2 = Low speed in-plant processes; 3 = Package reorientation; 4 = Medium speed distribution;

5 = High speed retail, mail order, postal/parcel; 6 = High speed airline baggage, parcel

\*\*\* No limitations

## STAGE 3: AFTERSORT

The aftersort technology selection is critical to prepare the product for its next step in the supply chain. The following are some considerations:

Aspect	Example Technologies	Challenges
Deceleration	Gravity or power discharge conveyors	Critical, especially with large product size/weight variance
Carton alignment	Manual; automated orientation	Critical for efficient palletizing, shipping
Carton sequencing	Manual; automated queuing; follow-on sortation	Critical for palletizing, shipping

## STEP 5 – REALIZE THE BENEFITS OF FLEXIBLE, PRE-ENGINEERED DESIGN

The installation of a sortation system must be rapid and flexible to allow for on-site design challenges, such as an inconveniently placed building pillar or utility riser. Multiple levels can dramatically increase throughput without expanding the system footprint. Modular engineering offers faster installation, better integration, and higher reliability compared to less flexible designs. In addition, pre-engineered components can dramatically shorten the configuration time required between purchase and installation. Equally noteworthy, modular design enables the rapid expansion or removal of functionality as your needs change over time.

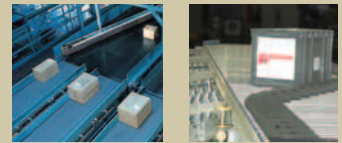
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The sortation system is the focal point of a distribution center. By way of the sorter, a company's saleable goods are transported to marketplace. The proper timeliness and absolute accuracy of the shipments are without compromise. It is understandable that the selection and application of the appropriate and reliable sortation system is one of the primary concerns facing today's distribution decision makers.

Determination of the correct sortation system must account for product characteristics such as size, weight, and the features of its conveyor contact surface while giving attention to gentle and appropriate product handling. Throughput rates, both current and future, are of prime significance as well as space constraints that may impact where the sorter will reside. In addition, budgetary requirements and growth plans must be factored in.

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