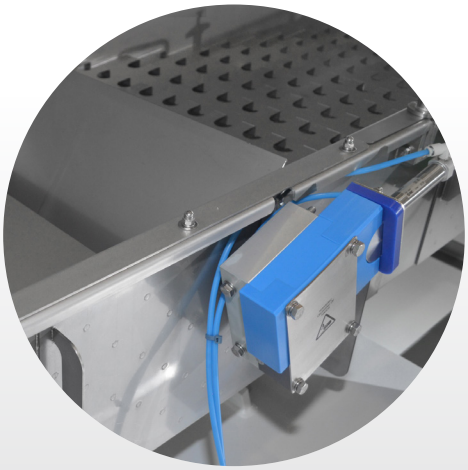
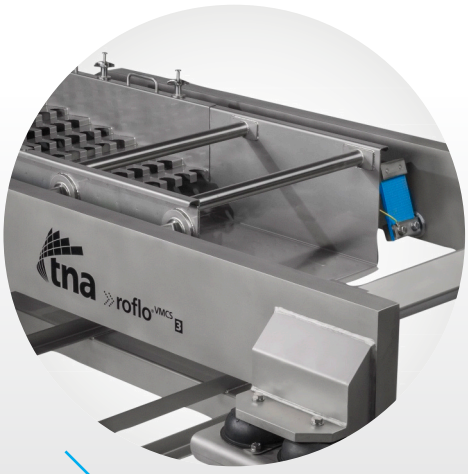
tna
packaging &
processing solutions

intelligent distribution systems

top 10 considerations when investing in distribution equipment





a tna white paper

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With a degree in mechanical and production engineering and over 20 years of experience working in the food packaging industry, Roger has extensive industry knowledge and is a global distribution systems expert. Roger joined the company back in 2010 and is based in **tna**'s US office, where he is responsible for the development and management of **tna**'s sales strategy for conveying & distribution systems.

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introduction

To maximise production yield and quality yet still deliver exceptional product quality and value, manufacturers must ensure their production lines run as efficiently as possible. Conveying or distribution systems play a pivotal role in achieving this, moving items through each stage of the production process quickly, intelligently, automatically and with extreme care.

But with a wide range of distribution equipment available across the globe, how do manufacturers select the most effective system for their production line? Plant operators must consider a number of factors before purchasing their distribution system so that it achieves the required quality standards within the available budget.

Here are the top ten considerations when investing in distribution equipment to expand and grow your business.

consideration 1
the products to be conveyed

Before even thinking about purchasing a distribution system, assessing which products are to be conveyed is vital. Every product behaves in a distinct way, exhibiting varying flow speeds and characteristics – a potato chip, for example, will display very different flow characteristics to a salad leaf. Bulk density and the desired volume throughput will also change from product to product.

These factors can influence the type of conveyor that is selected – whether it be horizontal motion versions for fragile confectionery or vibratory motion systems for difficult to transfer lettuce leaves, or if gated or gateless options are more suitable. In addition, the type of product to be conveyed can impact the length and depth of the distribution pan and what its surface texture should be – smooth or dimpled for example.

Involving the marketing team at this stage of the decision making process may also be helpful to evaluate future product development requirements or line extension plans. This ensures selection of the optimum distribution system which responds to production needs both now and in the future, avoiding further financial outlay a few years down the line.

consideration 2
specific product characteristics

The physical attributes of the product to be conveyed are also a critical factor. Are they light or dense, soft or hard, wet or dry? Are the items coated with oils or fats? How sensitive are they to moisture absorption? Dry, free flowing products such as pet foods or pasta are relatively straightforward to convey but when processing heavily coated products such as cheese puffs / curls they can cause clumping and / or build up issues on the distribution system. This can result in conveying control issues, flavour build-up and reduced product quality. Confectionery items that are chocolate coated, or have other delicate coatings like sugar can be difficult to transfer due to the risk of clumping, scuffing or chipping the outer layers.

Such characteristics should be used to determine the most effective distribution system for the production line and also the overall design of the system. Working with an equipment supplier like **tna** means manufacturers have access to a full range of distribution technology to support a variety of applications. These include horizontal motion conveyors which provide gentle product handling for fragile items and eliminate seasoning or coating build up, or vibratory motion conveyors with their vertical lift or "bounce" to smooth out lumps and bumps in product flows and optimise storage capability. For sticky fresh cut produce, salad conveyors offer a higher amplitude and lower frequency which allows easier conveying of sticky products. Air conveyors can be purchased too for the transfer of packaged goods to secondary packaging.

consideration 3
total cost of ownership

The purchase of a new distribution system is, without doubt, a significant financial investment for any organisation. To this end, it is vital that the equipment delivers the best possible value throughout its lifetime – this can be decades in some plants. Conveyors which consume minimal power to reinforce a company's sustainability goals, whilst achieving maximum product quality and are quick and easy to clean, maintain and repair can help support these aims.

The cost of ownership of conveying systems can be calculated easily by looking at the total number of conveying units multiplied by the power consumption of each unit. When deciding on the total number of units to include, the design must achieve all business goals while using the least amount of equipment. Incorrect design will dramatically increase your cost of ownership. Power consumption of individual conveyors can vary significantly with 1~2 amps being the ideal range.

The selected conveying system must provide the best possible product quality without any negative impact on sales volumes. A gateless conveying system will significantly reduce product damage or breakage through the absence of any device mounted on the end of the tray. Additionally, gateless options also offer the highest level of cleanliness and therefore no opportunity for cross contamination and bacteria build up – product comes into less contact with fewer surface areas and there are no moving parts where microorganisms can hide. This form of distribution system is only available from **tna**.

"The selected conveying system must provide the best possible product quality without any negative impact on sales volumes."

Reducing maintenance time and product repair costs are critical to ensuring a distribution system delivers true value for money. Choosing equipment with a simple design, with no wearing parts, will greatly reduce spares requirements and therefore overall cost of ownership. **tna**'s horizontal and vibratory conveyors are driven by simple electromagnetic drives so have no moving parts, such as shafts, gears, links or belts. This results in reduced maintenance costs and downtime, straightforward maintenance procedures and also increased equipment life.

consideration 4
how much product storage is required?

How much storage is required within a distribution system is a fundamental consideration for many plant managers and business owners, and one that should be discussed at the beginning of the design process. Storage provides a necessary automatic buffer between the process line and the packaging department within the conveying system. There is a fine balance between ensuring product quality and minimising the amount of aborted product. Too much storage escalates moisture pick up, potentially increases product breakage and inflates capital equipment costs; too little will increase product abort levels particularly when the total packaging line output is closely matched to that of the process line output.

As a starting point, **tna** typically encourages customers to consider the 20/20 rule when assessing storage options. That means when 20% of packaging stops the distribution system automatically holds back 20 minutes of process line output pre aborting any product.

There are a range of storage options available, all of which can conform to the 20/20 rule and work on a first in first out basis. Ultimately, the chosen method will depend on how much storage is required, the reasons for storage, quality restrictions and the type of products to be stored:

- In Line storage: the main line distribution conveyors that typically feed a row of bagmakers are oversized in height and width – this is the most cost effective solution, works well on longer packaging lines and is very gentle on the product
- Upstream storage: additional conveyors are incorporated into the system before the main line distribution conveyors – additional capital outlay is required, however. This approach works well on shorter packaging lines
- Upstream belt storage: a large box with stainless steel side walls and a live bottom belt can be manufactured to any size. This offers the highest level of storage volume but special care should be taken for fragile or moisture sensitive products

Other alternatives include recirculation systems where the product is returned back into the distribution system before the first packaging station after it has past the last. Purchasing additional 'scavenger' packaging stations also greatly reduces the need for storage but it is more costly

All systems, regardless of storage type and size, must have a reject method. In the event of a serious balancing issue between process and packaging, the store will fill up and will need to abort product out of the distribution system in a controlled manner rather than 'rain' product, which is when product spillage occurs.

tna recommends three reject points after any process line:

- Process line abort: this is located immediately after the process line and before seasoning. This allows product outside of your specification to be aborted in advance of adding expensive seasoning or coatings, eg PC soft centres.
- Seasoning abort: if an 'in kitchen' style coating system is being used, an abort before packaging is recommended. If the seasoning requirements fall out of spec then the product can be aborted before the packaging line.
- Packaging abort: if in line storage is adopted, the most effective place to abort is at the end of the packaging line.

consideration 5
sanitation – keeping it clean

With increasingly stringent food safety and hygiene guidelines in place across the world, plant and equipment hygiene is top of mind among site managers looking to eradicate foreign bodies, bacteria build up and avoid environmental contamination concerns. They therefore need easily accessible, simply designed machines with few moving parts to ensure they adhere to strict hygiene standards.

tna's complete conveyor range is made from food grade stainless steel with a 2B natural mill finish which can easily withstand aggressive fats, oils and flavours. The conveyors are also simple in design, ie there is no metal to metal bacteria build up areas and all conveyor trays are fully welded or scalloped. The design will allow for a full caustic wash down too. Easy cleaning can also keep product changeover times to a minimum which helps those producers looking at smaller order batches and quick turnarounds. Purchasing equipment which has few moving parts, such as gateless conveyors, means there is less opportunity for unhygienic bacteria build up, reducing the risk of HACCP (Hazard Analysis & Critical Control Points) or QA issues.

"Easy-to-use equipment which is installed safely and delivers top quality products is vital to ensuring the health and safety of all."

consideration 6
ensuring health and safety

Guaranteeing the health and safety of both plant operators and the product's consumers is another fundamental consideration for manufacturers. Easy-to-use equipment which is installed safely and delivers top quality products is vital to ensuring the health and safety of all.

Working with companies who not only manufacture and supply secure conveying systems, but also offer turnkey project management services can help ensure health and safety throughout the full installation process and for the life of the equipment going forward. With offices around the world, **tna** is able to provide solutions which satisfy both local and international health and safety requirements. This complete global project management offering means new installations can be designed and put in place safely based on an agreed timetable and to local and international regulations. Operators can also be fully-trained by **tna** system experts to ensure they know how to safely use the equipment

consideration 7
support after the sale

For high value equipment like distribution systems, the relationship between plant operator and machinery supplier should not end when the system is in place. Working with equipment providers that offer a comprehensive after sales service whatever the location, language and time zone will mean the distribution system runs more efficiently, delivering optimum outputs throughout the lifetime of the equipment.

tna's after sales service includes full training, and provides operators with on site advice and support on how best to use the equipment for maximum productivity. The company also offers an audit of how new and existing machinery is working and any improvements that can be made. And for new installations, a technical specialist can stay on site for an agreed period after the installation is complete to ensure the smooth running of the distribution system and troubleshoot any teething problems. tna also has offices and technical operators throughout the world which ensures rapid response to customer issues and enquiries.

Another important factor to consider is ensuring your supplier has local sourcing of all spare parts. The distribution system is the main artillery of product feeding for your packaging systems, so if one section of your distribution line goes down, it is going to prevent all product packaging. Therefore, quick local access to spare parts is paramount to maintaining the productivity of your line.

consideration 8
the operating environment

When selecting a distribution system, the location in which it will operate is as important as the equipment itself. The existing space and surroundings of the facility will have a key impact on both system type, overall design and installation procedures. What is the product flow path through the plant? Does it have a sloping floor? Where are the drains located? What are the temperature and humidity levels year round? Where are the existing services? Does the new system have to interface with existing equipment? These are just some of the factors that must be considered before a new conveying system is purchased.

Working with a supplier which offers a full range of distribution equipment plus a comprehensive project management service, can help manufacturers fully audit their operating environment. This enables them to design and install the most efficient and effective distribution system to match their processing and packaging needs.

"The existing space and surroundings of the facility will have a key impact on both system type, overall design and installation procedures."

consideration 9
the budget

Budget will always be a key driver when selecting distribution equipment. But price should not necessarily be a compromise to purchasing the system that achieves an operator's processing and packaging objectives.

Equipment manufacturers like **tna** which offer an extensive portfolio of conveyors enable manufacturers to select the most appropriate system to match their needs. And as **tna** can supply all the equipment in the production line, not just the conveyors, it is able to provide its customers with the optimum layout, which ensures as few conveyors as possible are used, minimising overall machinery footprint, capital expenditure and system costs whilst achieving the highest level of product quality and maximum output.

consideration 10
future expansion

Although it is impossible to accurately predict the future, most organisations have a broad indication of their business pipeline for the next three to five years. This can include plans for new products, the expansion of existing product ranges or for significant increases to manufacturing volumes.

Taking these planned developments into account can help operators "future proof" their distribution systems and save money in the long run. **tna** has a modular design for complete distribution and packaging systems which can be easily expanded and upgraded to suit future business requirements.

summary

Distribution systems make an important contribution to the smooth and efficient running of a manufacturing line so selecting the right solution from the start is critical. By taking into account these top ten considerations, manufacturers will be better placed to choose the best solutions to support their specific product and installation needs and deliver the quality, value and outputs they require.

If you would like to find out how **tna** can help you with your distribution solutions requirements, please contact us at www.**tna**solutions.com or email us at info@**tna**solutions.com

About **tna**

tna is a leading global supplier of integrated food packaging and processing solutions with over 14,000 systems installed across more than 120 countries. The company provides a comprehensive range of products including materials handling, processing, coating, distribution, seasoning, weighing, packaging, cooling, freezing, metal detection, verification and end of line solutions. **tna** also offers a variety of production line controls integration & SCADA reporting options, project management and training. **tna**'s unique combination of innovative technologies, extensive project management experience and 24/7 global support ensures customers achieve faster, more reliable and flexible food products at the lowest cost of ownership.

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