



POWDERS, HANDLED.

WHITEPAPER

# IMPROVE MANUFACTURING FLEXIBILITY WITH BETTER BLENDING

## Why in-bin blending gives you a competitive advantage

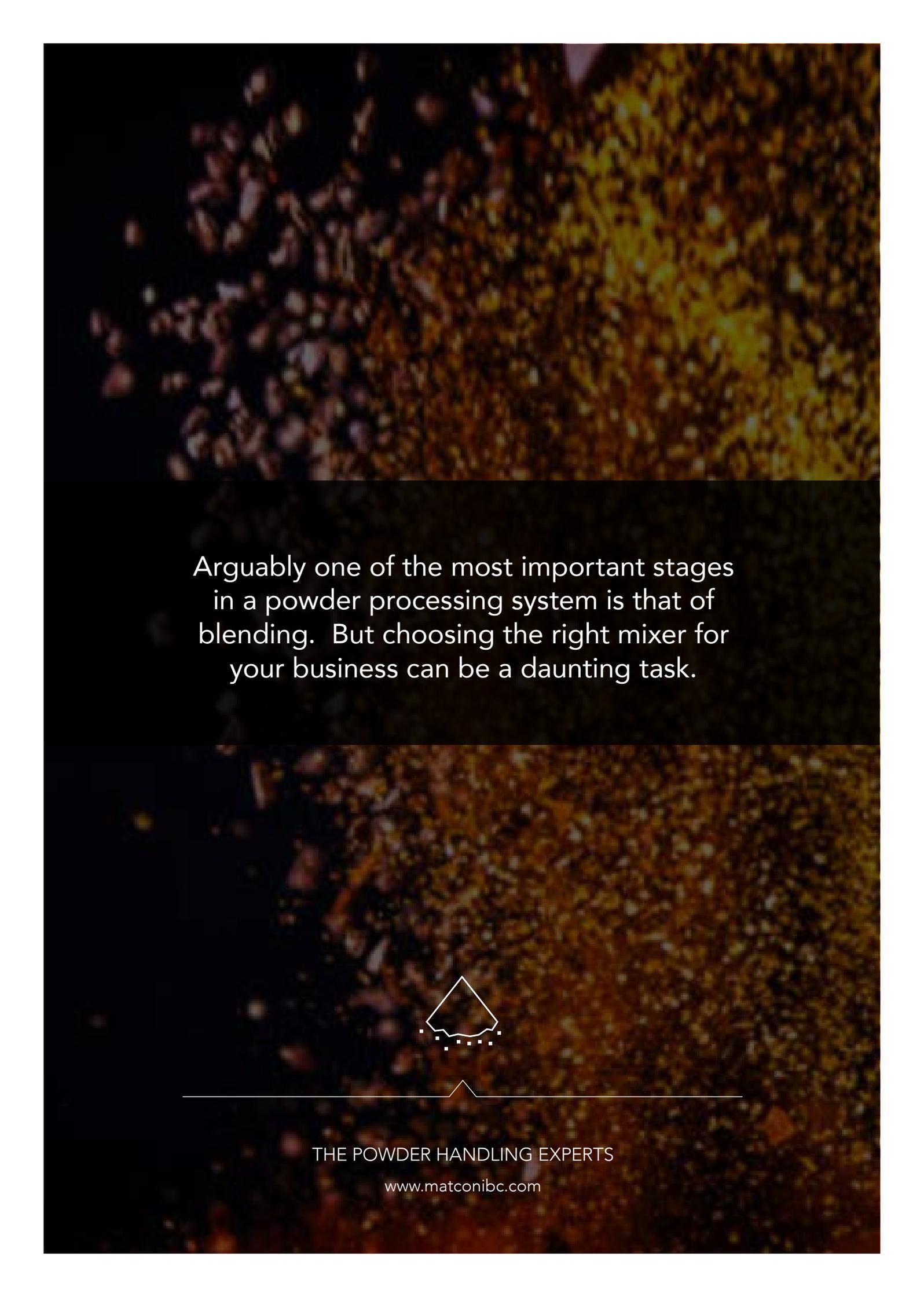
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Arguably one of the most important stages in a powder processing system is that of Blending. Combining powders in an industrial mixer transforms them from individual ingredients into valuable products. Choosing the right mixer for your business can be a daunting task.



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# IMPROVE MANUFACTURING FLEXIBILITY WITH BETTER BLENDING

Why in-bin blending gives you a competitive advantage

The blending stage is a notorious bottleneck within a factory. Getting this right has a big impact on the overall efficiency of the whole production line, yet the choices are almost endless.



To further complicate matters, consumers are looking for ever more variety from manufacturers these days, meaning that more and more recipes are being added to the portfolio. How can you balance the need to produce a variety of different recipes every day, whilst maintaining high hygiene and production standards, without harming production efficiencies or running up huge operating costs?

Whether you are just getting started or are a seasoned professional, how do you know where to start in selecting the ideal industrial mixer for you and what should you consider in your planning? Get it right and it won't just combine ingredients more effectively, it will give you a competitive advantage.

## IMPROVE MANUFACTURING FLEXIBILITY WITH BETTER BLENDING

Why in-bin blending gives you a competitive advantage

### Don't let tradition hold you back

Overall equipment effectiveness (OEE) needs to be at optimal levels to ensure you derive maximum benefit from your production line. And the blender sits at the centre of that operation.

In a traditional in-line operational set-up, large fixed mixers are joined up to storage silos, day bins and packing lines by a series of screw conveyors, blowing systems and pipework. This linear format relies on ingredients entering the system at formulation, going through all the process steps in sequence, before being delivered out at the far end as the consumer SKU. The problem here is that the production line will only be as good as the weakest link. So many different processing steps take place along the way, using a myriad of different equipment, that it is a hard task to keep all these stages perfectly synchronised. It doesn't take much for something not to be working particularly well resulting in bottlenecks and waiting time quickly building up.

While recipes are being formulated the mixing and packing devices are out of use, then whilst mixing of ingredients takes place, the packaging equipment remains unused. And finally, as the finished product is being packed, the industrial mixer is back on standby and standing idle. Wasted time everywhere.



**Innovative technology and decades of powder handling experience, make in-bin blending a real opportunity for manufacturers to realise huge savings.**



**While recipes are being formulated, mixing and packing devices often sit idle.**

Niche consumer demands reveal a further weakness with this in-line approach. A hike in the number of recipes you need to handle means more frequent clean-down of equipment between different recipes. And, with cross-contamination being a real risk to brand image, cleaning between changeovers is more involved and takes longer these days.

An alternative for a modern lean factory is to take a parallel-processing approach using Intermediate Bulk Containers (IBCs), which enable the process steps to be decoupled so that formulation, blending, packing and cleaning all take place simultaneously, whilst also being able to accommodate different recipe batches safely throughout the process line.

IBCs are used to transport material around the system taking it from formulation to blending and onwards to packing. As multiple IBCs can be utilised in the system at the same time, it means that all process steps can be kept fed with product and lean flow can be achieved. The bottleneck at blending is

removed as the IBC itself becomes the blending receptacle. No product comes into contact with the blender, so changeovers are virtually instantaneous. As all the processes operate independently and continuously much higher OEE rates can be established.

In addition, because the IBCs are fully closed at all times, cross-contamination is eliminated meaning that multiple different recipe batches can circulate round the system at the same time without compromising safety. Allowing you to process several different orders at the same time, creating capacity to accommodate time-sensitive jobs.

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This super-lean approach can increase OEE from 15-20% to 75-80%, significantly increasing revenue meaning your IBCs pay for themselves.

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## What to look for in a blender three key success factors

When searching for a new blender, don't dull your competitive edge by following the crowd and using the same tools as everyone else. And don't be swayed by the cheapest option just to get started; with blender technology, buying cheap can often mean buying twice.

Here's how the right blender technology puts you ahead of your competitors, increasing capacity, improving product quality and saving costs.

### Key Success Factors

1. **Increase Capacity**
2. **Improve Product Quality**
3. **Save Costs**

#### 1. INCREASE CAPACITY

It's obvious, but the more the mixer is working the more product can be produced. This can be achieved by either faster processing time or reducing the length of time it sits idle and spends in cleaning.

##### **Value end-to-end processing time over blend time**

Misplaced claims of four-minute blend times for fixed mixers fail to consider the full end-to-end process. In reality, the time taken - from filling the mixer to it being emptied and ready to go back into operation - can take as long as five hours depending on the size of the fixed mixer.

In-bin or IBC blending might take around 10 to 15 minutes to run the blend cycle but they save time in the long term. That's because the IBC is filled off-line, and once blended is removed immediately and taken to packing. As the blender itself doesn't need to be cleaned it can be reused immediately even for a different recipe. The only limiting factor is how quickly the operator can install and remove the bins from the blender.

##### **Achieve Less Downtime and Fewer Changeovers with In-Bin Blending**

When making several different recipes in the same day, a fixed industrial mixer requires a comprehensive, time-consuming clean-down at every changeover. This further increases the already lengthy end-to-end processing times as discussed. Switching to in-bin blending removes this need for cleaning, as there are no product contact parts since the IBC is the blending vessel, so you can enjoy immediate changeovers, enabling up to four batches per hour to be completed.

##### **Enhance small batch capability and eliminate multiple mixers**

The biggest fixed mixer you can afford is not always the wisest of investments. It might look like it will save you handling time. It might be able to process quickly. But have you considered how long a mixer of that capacity will take to fill by ripping and tipping 25kg sacks, let alone the time it will take to empty or be called off by packing. During this time it will stand idle and be unproductive – not very lean. What



## A simple IBC system achieves efficient lean manufacturing.

about if you need smaller batch runs? Is it practical to fill it with a half batch or quarter batch or lower?

As we have already established, IBCs are formulated off-line removing any idle time at the blender. In addition, IBCs come in a range of sizes that can be accommodated on a single IBC blender. This gives you the flexibility to offer different batch size manufacturing capabilities without needing dedicated fixed mixer lines or trying to fill large mixers to a small % fill level.

## 2. IMPROVE PRODUCT QUALITY

Your customers expect a perfect product every time which puts product quality at the front line of customer loyalty and retention. A quality blender produces a homogenous mix, the right transfer methodology prevents mix segregation and a hygienic design removes the risk of cross-contamination.

### Deal with difficult powder characteristics

Free-flowing powders with similar particle sizes mix easily while cohesive

powders often don't. Your new industrial mixer needs to be able to gently handle the looser powders and apply force to sticky powders so they fold and join.

IBCs offer smooth surfaces that don't trap ingredients and complementary laceration blades that can be fitted into the IBC as necessary to apply the right amount of shear. This ensures each powder type is intermeshed and managed appropriately and avoids material degradation and heat build-up.

### Reduce cross-contamination risk with closed bins

An increasing focus on food intolerances means that products containing allergens become even more difficult to manage. If different recipes are mixed in the same mixer, cleaning is key to reducing cross-contamination risks. Yet fixed mixer and in-line conveying systems are particularly difficult to clean and fully validate because not only is a network of complicated pipework involved, but the system is close-coupled, which means the whole system is out of action whilst cleaning takes place. In some cases

it can take a whole shift of operators to make a clean-down.

To mitigate the risk, some companies dedicate a production line to an allergen recipe. But in today's marketplace is this really practical anymore? How many lines would be needed? Rather than dedicating an individual mixer to each allergen recipe, it is easier to use the straightforward, safe solution offered by in-bin blending. Containers are sealed, reducing contamination risk, and as the blender does not contact the product, it can be used again immediately. The dirty IBCs can be taken off-line for a thorough cleaning. The hygienic, simple design of some IBCs mean that they can be used one time for allergenic products before being used again for non-allergenic products. Or alternatively, keep IBCs dedicated to handling each allergen which is a far more cost-effective solution than dedicating entire production lines.

### Reduce after-mixing segregation risk and preserve product quality

A fixed industrial mixer may blend materials well but as product is

## What to look for in a blender three key success factors (Cont.)

transferred out of the mixer a range of issues can cause powders to desegregate. Air can push finer materials back inside and high transfer heights mean particles with differing size and density travel at different speeds separating your carefully combined mix.

IBCs reduce drop height as they feed more directly to packing and the inclusion of Cone Valve technology means product is released under mass-flow discharge so all particles move through the bin in unison. The formula for great product quality every time, from beginning to end.

### 3. SAVE COSTS

Costs can be saved in many ways with IBC blender solutions. Reduced idle time wastage, lower manpower cleaning requirements and a more efficient blending process can reduce the number of shifts required or free up production capacity, as we have already discussed.

There are a number of other savings to be made too:

#### Reduce your losses

You can see the amount of product lost on the floor during a shift but have you ever considered which expensive, value-adding ingredients are left behind in the blender only to be washed away? All fixed mixers have some residue at the base of the mixer bowl or clinging to the sidewalls, shaft, paddles and bearings. The more surface area the greater the loss. Add to this the cost of conducting a thorough clean into all the corners and joints of the fixed mixer, and this adds up to a substantial amount of cost in both product losses and manpower hours.

With in-bin blending, smooth internal walls reduce the likelihood of product becoming trapped. And it's only the container itself which needs to be cleaned which takes place off-line, maintaining an optimal workflow and maximising OEE rates.

#### Optimise factory space

Every square foot of your factory floor costs money. Using it efficiently is important.

IBC blenders tend to have a small footprint and low head height taking up minimal space. Because IBC systems are sealed units they keep the working area contamination free which means that expensive clean room requirements can be kept as low as possible.

#### Reduce stock

With batch run-size flexibility it also means that space-hungry WIP/WIQ and inventory associated with larger production runs is reduced, further diminishing the need for massive warehousing space and systems.





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## Not ready for a wholesale switch?

Consider changing one part of your operating process at a time and taking a staged approach.

You might already be in production with a traditional fixed system which has served you well in the past, but is now holding you back. If you're not in a position to make a full-scale switch to an IBC system in one go, it is possible to consider changing one part of your operating process at a time and taking a staged approach. The modular nature of an IBC system design makes it easy to add new modules as the need or opportunity arises.

### Quick Fixes

Typical changes that can be made are:

#### Separate mixing from packing

Double the capacity of both of these pieces of equipment by decanting mixed product straight from the fixed mixer into an IBC, rather than feeding it close-coupled to your packaging lines, which call it off at a slow rate. This means that the IBCs can be continuously feeding packing while new batches are formulated

and mixed in the fixed mixer. The improved turnaround times of the mixer increase throughput capabilities.

#### Decouple raw material batching from mixing

Separating these processes by preparing recipes in offline IBCs, which are then used to fill the fixed mixer, not only speeds up loading times but also increases available processing time, improving efficiency by around 50% or more.

#### Create premixes in an IBC blender

High volume production lines can benefit operationally from pre-mixing the micro and minor ingredients and adding them into the process in dosed amounts. Using static fixed mixers for this is proven to be fruitless. IBC blenders on the other hand are perfect for creating a micro and minor ingredient pre-mix offline, following which the IBC can directly dose into the fixed mixer. Cone Valve technology within the IBC prevents the mix from becoming segregated as it's discharged.

#### Substitute static mixers for IBC blending

The final step is to eliminate mixer idle time with an IBC blending system. Recipes are formulated offline and because the IBC is the blending vessel there's no need to clean down between recipes. Multiple recipes are run at the same time without cross-contamination and any recipe can be inserted to the production schedule at any time. One IBC Blender can supply up to five packing lines enabling different packing formats in one batch run.



## How IBCs have helped the market move on

From food and nutrition to pharmaceutical and chemical, and everything in between.

Matcon have worked extensively with a range of manufacturers around the world in an even wider variety of industry sectors from food and nutrition to pharmaceutical and chemical, and everything in between. We have experienced a multitude of powder types and behaviours and have been instrumental in creating lean manufacturing systems for companies large or small. Here are just some of the ways in which we have helped:

### Spicy inventory savings

One of our clients, a leading spice blends contract manufacturer uses an IBC system to hygienically handle a product portfolio of over 1,000 flavouring mixes. Their three-day make-to-order regime has enabled them to greatly reduce costly inventory and be responsive to their global market.

### IBC blending doubles infant nutrition capacity

Infant Nutrition manufacturer, Hero, uses IBC blending to pre-mix micro/minor ingredients offline, speeding up the pre-mixing stage and reducing clean-down times between batch runs. This doubled their production capacity and achieved a 30% reduction in stock, saving 1,000 hours of cleaning and reduced their lead times.

### Reduced costs and manufacturing times baked in

Bakery manufacturer British Bakels, added a Matcon IBC System alongside their fixed mixing system to give them the ability to produce the high variety, low volume product lines and accelerate their NPD programme. This alternative line cut cleaning times from 480 to 70 hours compared to the fixed mixer system, reduced labour costs by 25% and released £175,000 tied up in inventory. Manufacturing time has also been cut in half enabling the company to meet consumer demand and expand their product range which includes some gluten-free products.

Simon Dawson, Operations and Engineering Manager said,

**“we can now offer an enhanced product range, better flexibility of pack sizes, along with significantly enhanced quality assurance and customer service.”**



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## Are You Set for the Future?

Investing in a new industrial mixer is a serious decision.

With multinational manufacturers and smaller SMEs embracing IBC system technology, it's time to make sure you don't get left behind.



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# IBEX