



Plant-to-plate planning for Food & Beverage productivity and safety

ABB Safety Series

Food & Beverage

Installation Products Division



**Boosting productivity and safety
across Food & Beverage production**

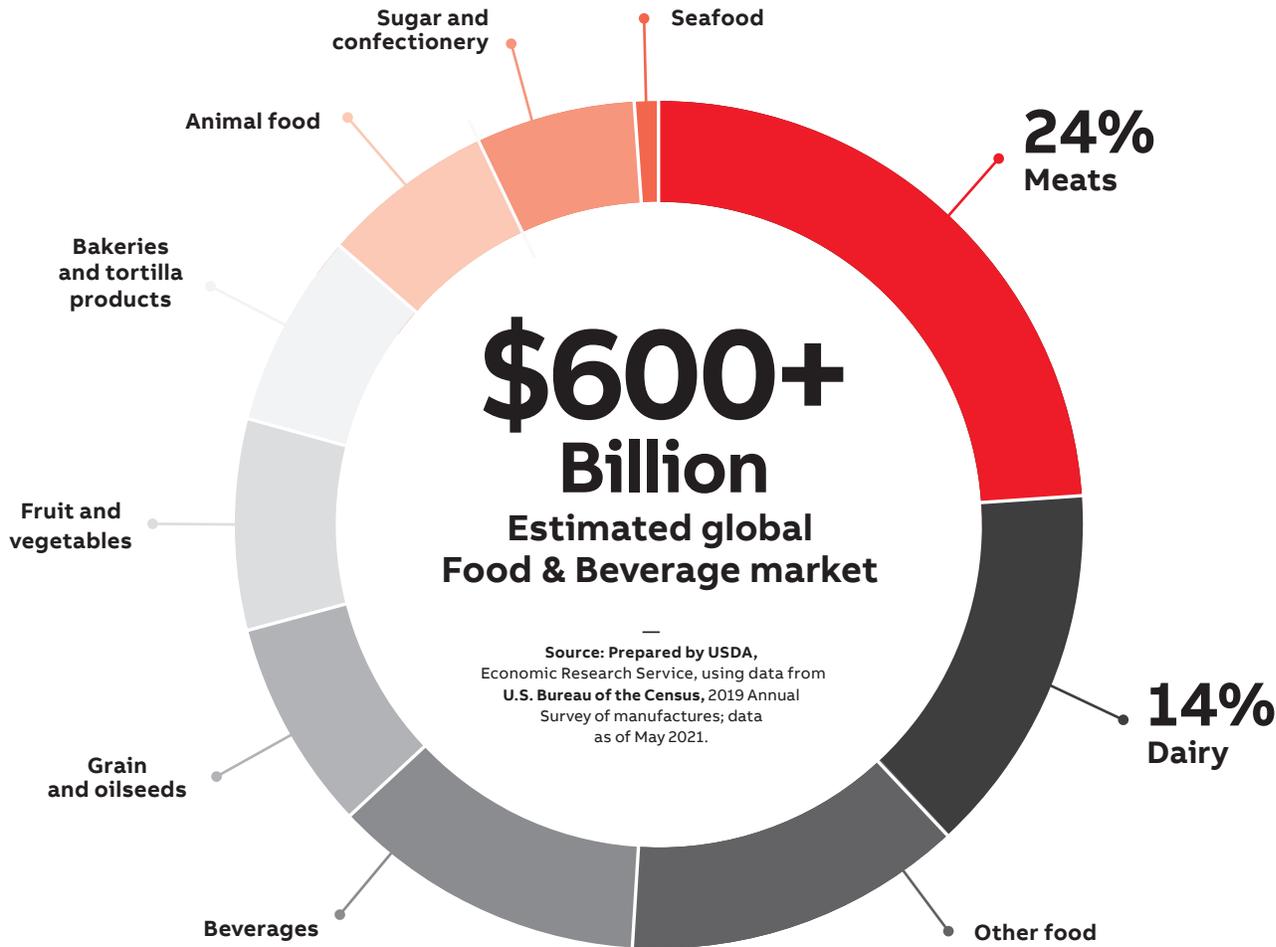


ABB Food & Beverage Safety Series

Today, the global food and beverage market is estimated at more than **\$600 billion**. Food processing and handling is considered one of the fastest-growing industries globally.



Part of a series on electrification and safety in Food & Beverage processing



Production of farming inputs

such as seeds, fertilizers, animal feed, nutrients and equipment.

Production of raw commodities

such as wheat, sugar cane, fruit, rice, milk, meat, poultry and fish.

Initial processing

of raw commodities, so they can be used as inputs to a range of end products.

Conversion of ingredients

and commodities into forms that can be easily consumed and distributed to consumers.

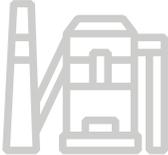
Food & Beverage storage,

warehousing, fulfillment and transportation.

Distribution of finished goods

to consumers in home, stores and restaurants.

Food and water have always been essential human needs. Over thousands of years, people have sought **faster and safer** ways to prepare, preserve and package what they eat and drink.



1 Components of food & beverage manufacturing

Even in ancient times, both primary (e.g. drying, milling, oil extraction) and secondary processing to formulate and manufacture into the final product were employed to convert produce and ingredients into safe and palatable foods and to extend shelf life.¹ In 2019, food and beverage manufacturing plants accounted for 15.8 percent of the value of shipments and 14.7 percent of all

employees from all U.S. manufacturing plants. Because intermediate inputs (primarily agricultural materials) account for a relatively large share of Food & Beverage manufacturers' costs, value added in Food & Beverage manufacturing represents a slightly smaller share (14.4 percent) of value added in all manufacturing.²

Meat processing is the largest component of Food & Beverage manufacturing with 24 percent of shipments in 2019, followed by dairy product manufacturing with 14 percent.

Transforming raw agricultural materials into products





Plant to...



2 Global growth

By nearly every measure, the global Food & Beverage market is growing. Almost every aspect of the F&B industry is seeing increases. This includes ingredients, demand for organic products, packaged foods and plant-based meals, sanitation and food safety testing, traceability, shipping, process automation, and production jobs and equipment.

One change is 2020 food spending by U.S. consumers, businesses and government entities, totaling \$1.69 trillion, down from \$1.79 trillion in 2019, partly due to the pandemic that disrupted typical food consumption.

However, food-at-home spending (food purchased from supermarkets, convenience stores, warehouse club stores, supercenters and other retailers) increased from \$808.0 billion in 2019 to \$876.8 billion in 2020, while food-away-from-home spending (food purchased from restaurants, fast-food places, schools and other away-from-home eating places) decreased from \$978.2 billion in 2019 to \$813.4 billion in 2020.

This resulted in food-at-home spending accounting for 51.9 percent of total food expenditures, the first year it has accounted for more than half of food spending since 2008, during the Great Recession.³

In a dynamic and constantly changing environment, food and beverage companies are focusing on flexibility, safety and quality. Processors have a Food Safety Plan that is constantly evaluated and updated.

Increasingly, our partners look to ABB to ensure their playbook addresses critical electrical systems and supports their ability to respond to diverse production requirements and customer needs.

3 Flexibility is key

Shifting consumer behaviors and lifestyles, dietary demands, and supply challenges have forced many Food & Beverage processors to focus on flexibility. Working with partners across the food and beverage processing cycle, ABB is helping companies respond to production pressures and short product life cycles.

ABB's modular systems, cable protection and wire management products, and solutions that offer cleanability, detectability and corrosion-resistant properties are helping companies be nimble, while maintaining productivity, safety and quality.

Putting a plan in place.

ABB helps F&B processors develop plans to drive consistency of practices and support technology needs, incorporate installation training certifications, maximize uptime, and return to normal operations quickly when disruption occurs.



...plate planning



4 Assessing critical needs

Food and beverage processing are critical elements of the food supply chain and every facility is responsible for food safety.

From raw ingredients and storage to processing and packaging different foods, every step is subject to regulations and requirements that help ensure the products are safe for consumers.

While Food Safety Plans aren't new, the ability to adapt to changing customer needs and evolving standards, as well as incorporate innovations in system design and materials are important considerations. Advances in automation, digitization and electrification can help F&B companies drive analytics, comply with new requirements and enhance productivity.

Increasingly, food safety planning needs to go beyond policies and procedures to address prevention and protection. A comprehensive plan includes:

- Food safety policies and compliance
- Physical infrastructure
- Testing
- Education and training
- Traceability
- Cost-containment
- Supply chain management
- Artificial intelligence
- Globalization
- Digitalization
- Data
- Automation
- Security
- Sustainability
- Systems
- Packaging
- Purchasing



The ABB team works with food and beverage partners to assess critical issues in every area of their operation.





5 Driving dependability, detectability and digital insights

While food processors have more data than ever, they tell us what's important to them is having electrical reliability standards in their Food Safety Plan.

Whether it's how a component will hold up to caustic chemicals, ensuring detectability in various types of foods and liquids, resisting corrosion or enabling equipment to be offset to support clean-in-place sanitation processes, ABB leverages expertise across the entire food and beverage processing spectrum to help with plan development.

When considering electrical solutions, food and beverage processors are often unsure how a new solution will perform or impact their process until they install it.

ABB extensively tests its solutions and can help food and beverage manufacturers understand how a product will perform in their specific environment. These investments in research and development, testing, and collaboration enable us to continue to drive innovation that maximizes flexibility and helps reduce risk across the F&B production cycle.

The huge push in the industry toward digitization and automation brings many benefits, including insights across the **production cycle** and greater food safety.



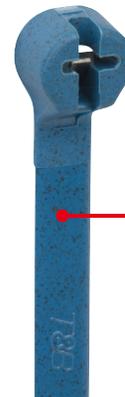
14%

Dairy

Dairy is the second largest component of Food & Beverage manufacturing / research and development.

ABB focuses on technology, systems and components to connect and protect power in all types of manufacturing settings.

These include modular designs, metallic and non-metallic solutions, specialized Ty-Rap® cable ties, stainless steel connectors, cable tray and conduit, and cable jackets that can hold up to caustic chemicals.



Ty-Rap®

Detectable cable ties
Detectable by metal detectors
set at minimum 1.5 mm
diameter ferrous sphere.

In addition to ABB Installation Products solutions and systems, we increasingly work with teams on broader education and training beyond equipment. This includes methods to protect against corrosion and prevent ingress.

ABB conducts a fresh review of a Food & Beverage operation and provides input on **electrification** options.



6 Building playbooks

Working with distributors and often collaborating with the food and beverage manufacturer, ABB can provide a no-cost, confidential site assessment to help identify and address any existing and potential electrical issues.



Business playbooks

outline all the elements that make up a company's go-to approach for getting things done.

We're often asked to help a company build its playbook and integrate holistic solutions to address reliability and safety questions such as:

- How can I increase uptime?
- How do I improve safety for my employees?
- What solutions are right to ensure reliability of production lines?

After assessing a facility's electrical systems, ABB outlines solutions that can help consistently:

- **Enhance** overall equipment, plant and personal safety.
- **Increase** overall equipment effectiveness (OEE).
- **Extend** electrical system service life by up to 300%.
- **Improve** sustainability and revenue.
- **Cut** electrical system changeover, leading to a 40-50% reduction in downtime.



Taking a holistic approach, ABB helps Food & Beverage plants execute **plans** that enhance productivity and safety.



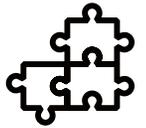
Integrated solutions

A large, prepared meat processor frequently reconfigured its facility and pieced together electrical equipment as it added new lines and technology. The company sought a comprehensive electrical system review to understand how integrated solutions could help them reduce changeover time and increase effectiveness and safety. They were able to implement modular systems and compatible solutions that improved cleanability, reliability and speed.



Corrosion resistance

A prepared frozen food facility that packages quick-fix meals installed aluminum in several areas as a lightweight option that would save on initial installation labor and material cost. Less than a year later, the facility team removed all the material and replaced it with ABB's Ocal® PVC-coated conduit systems to protect its wiring, while offering maximum corrosion-resistance, cleanability and color-coding organization.



Preventative processes

A quality team at facilities producing ready-to-eat products and prepared food focused on adding compatible components from ABB, so joints and metals help safeguard against leaks and contaminants and allow for cleaning at higher psi or temperatures.



Explosion protection

An ABB Plant Installation assessment at a leading bakery revealed excessive dust build-up underneath equipment. The high level of accumulation was combustible. The danger was magnified by the fact that numerous electrical system covers were removed, leaving exposed conductors. To address this flammable dust challenge, the facility installed ABB's explosive proof-rated electrical components.





7 Plans & site assessment

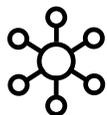
A site assessment includes the following steps to help assess and address areas of concern and match the correct product to the correct application:

1. **Consultation & plant walkthrough** - ABB assessors review a facility's installation system assets and challenges before conducting a plant walkthrough, which average 2-4 hours per 200,000 sq. ft.
2. **Findings & recommendations** - If any existing and potential risks are identified that could affect a plant's electrical system and uptime and profitability, ABB prepares a Final Value Proposition (FVP) document. An FVP outlines key application areas and recommendations, including cable protection and wire management solutions, food safety and facility sustainability. There's no obligation to implement the solutions.

Key considerations and areas of review:

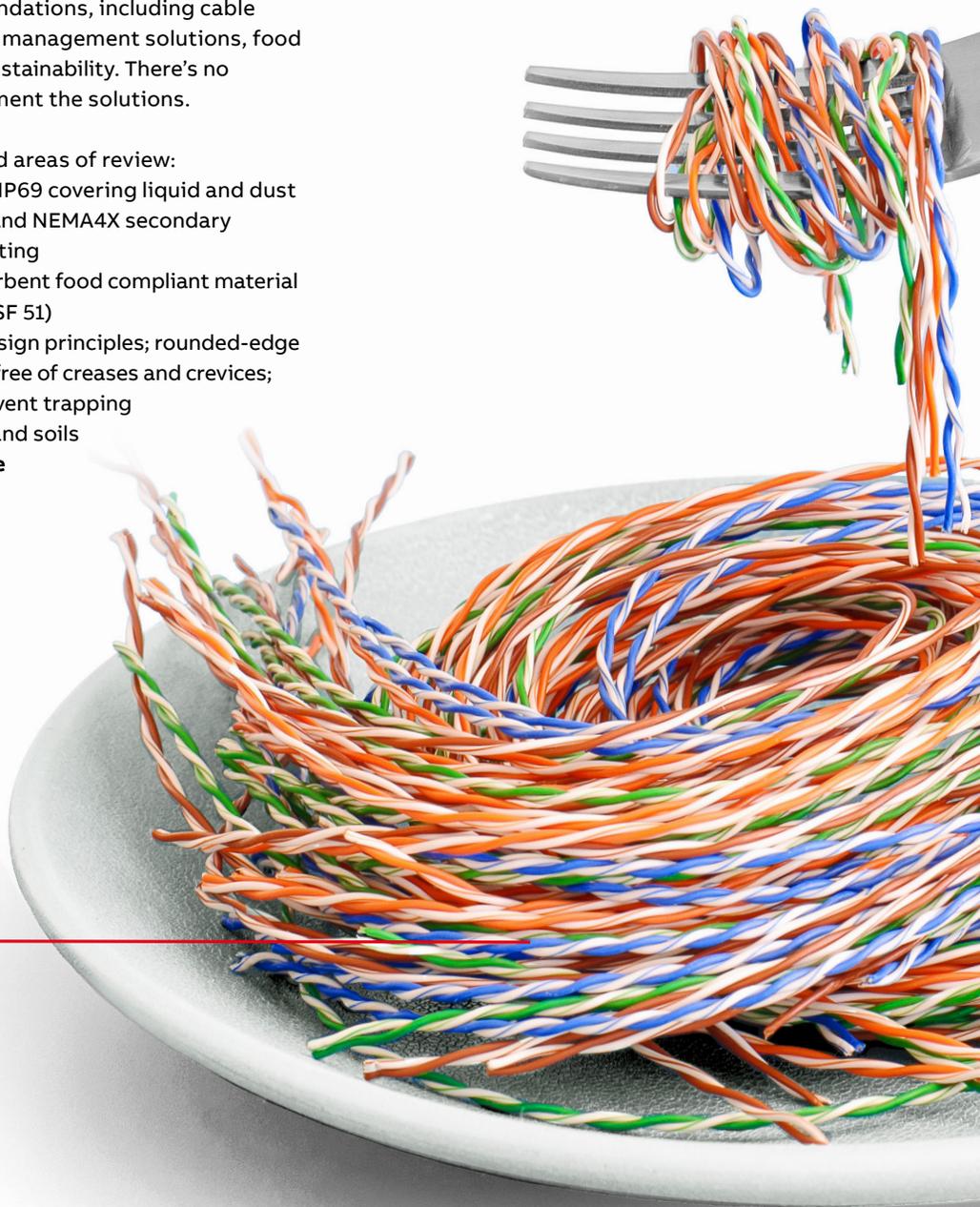
- **Protection ratings** - IP69 covering liquid and dust ingress protections and NEMA4X secondary ingress protection rating
- **Materials** - non-absorbent food compliant material (FDA CFR Title 21 / NSF 51)
- **Designs** - sanitary design principles; rounded-edge and smooth designs free of creases and crevices; and designs that prevent trapping food, contaminants and soils
- **Corrosion resistance**

- **Welds** must be smooth and continuous (3A Sanitary Standard)
- **Cleanability** - 360-degree cleanability, easy to clean and cleanable to the microbial level
- **Eliminate** horizontal surfaces
- **NSF** for Food Zones or Splash Zones
- **Accessibility** - for inspection, cleaning, maintenance and sanitation
- **Laser etching** with no stickers, raised or recessed letters
- **Hygiene compatibility** with other systems in the facility
- **Validated cleaning** and sanitation protocols
- **Hygienic guidelines**



Hygienic

Compatibility
with other systems



Through the ages and still today...

... food and beverage processors are challenged to implement and maintain food safety practices, while **quickly** and consistently producing high quality food and drinks for people to safely enjoy.



Although food and beverage processing and safety practices have come a long way since ancient times, advances in materials and methods continue to improve.

The pandemic shined a light not only on food safety and supply shifts, but the ability of food and beverage processors to be agile in scaling production and adapting to consumer needs. As the F&B sector seeks to modernize, become a data rich environment, produce innovative products and improve uptime, it must continue to maintain the highest levels of quality and safety.

References

- ¹ Knorr D, Augustin MA and Tiwari B (2020) Advancing the Role of Food Processing for Improved Integration in Sustainable Food Chains. *Front. Nutr.* 7:34. doi: 10.3389/fnut.2020.00034
- ² USDA <https://www.ers.usda.gov/topics/food-markets-prices/processing-marketing/manufacturing.aspx>
- ³ USDA <https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/food-prices-and-spending>

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About ABB Installation Products

ABB Installation Products Division, formerly Thomas & Betts, is a global leader in the design, manufacture and marketing of products used to manage the connection, protection and distribution of electrical power in industrial, construction and utility applications. With more than 200,000 products under more than 38 premium brand names, ABB Installation Products solutions can be found wherever electricity is used.