How do you achieve proactive food safety?

Extend hygienic-design thinking to every component

The critical importance of food safety

Rising recall numbers

Since 2012, the food and beverage industry has seen a big increase in units recalled—a 92,7% spike in FDA recalls and an 83,4% increase in recalled products by USDA.[1)]

Contamination via bacteria and allergens

Bacterial contamination and undeclared allergens together represented 75% of the top FDA food recall causes based on units.[2)]

Expanding recall costs

The average cost of a significant product recall claim in the food and beverage industry averages out to US$9.5 million (€8 million)—not to mention the lasting impact to an organization's brand.[3)]

Shifting from reactive to proactive

Food safety management systems described in the ISO 22000 standard and such laws as the Food Safety Modernization Act (FSMA) have helped drive a transformation in how the global food and beverage industry views and achieves food safety.

The focus shifted from reacting to problems after they occur to proactively preventing incidents through a variety of mandates, recommendations, and controls.

And with recalls on the rise and their associated business costs growing in kind, it's no wonder that **proactive food safety has become the top-of-mind concern** for food and beverage executives.

At the plant level, however, the ever-present goals of reducing maintenance downtime and costs, maximizing output, and limiting waste must be prioritized alongside food safety if food and beverage organizations are to achieve their business goals.

This means **maintenance, operations, quality, health and safety, and sustainability leaders must work together** to find solutions that mutually benefit all areas, from food safety and environmental impact to output and TCO. But that is easier said than done—especially when suspected improvements in one area can inadvertently hinder efforts in another.

Can reliability efforts negatively impact food safety?

Let's explore an example. Imagine you've just overseen the installation of a hygienically designed conveyor belt to increase food safety in the specific areas where your products and machinery come into contact the most.

You follow a strict cleaning regime at regular intervals to prevent contamination. And to ensure reliability of the machinery and production uptime, you relubricate bearings during planned downtime, typically after wash-downs.

While this scenario seemingly paints a picture of food safety and production efforts working in harmony, examine it more closely at the component level, and you'll see a different story. >>

The blue conveyor belt will provide optical detectability of any debris resulting from damages to the belt. However, it does not provide detection of greases, particulates, and other contaminants.

If the **bearing units** are not hygienically designed in a similar fashion as the conveyor, they **can actually become collection points for bacteria and allergens**, thereby making them the weak link in a hygienic system. Food and beverage processing contaminants can get behind the bearing housing if not effectively sealed, creating a moist environment favorable to bacteria growth. Bacteria and allergens can also collect in the excess grease that results from relubricating bearings, which may or may not be specifically cleaned—via wash-down or dry cleaning with paper towels or rags.

Then when the conveyor belt is cleaned as part of routine procedures, **the proximity of the bearings means bacterial contaminants can be inadvertently sprayed onto previously disinfected areas**. And, of course, once contaminants are in the food zone, the very products you want your consumers to safely enjoy—and come back for again and again—have been put at risk. Contaminated food could lead to costly recalls, unplanned downtime, compliance penalties, and long-lasting brand damage that goes right to the bottom line.

Excess grease from the bearing has collected on the hygienic conveyor belt, increasing the potential for bacteria or allergens to enter the food zone and compromise food safety.

View the animation

See how bacteria from bearing units can spread as a result of a cleaning regime.

Examining all components with an eye toward hygienic design

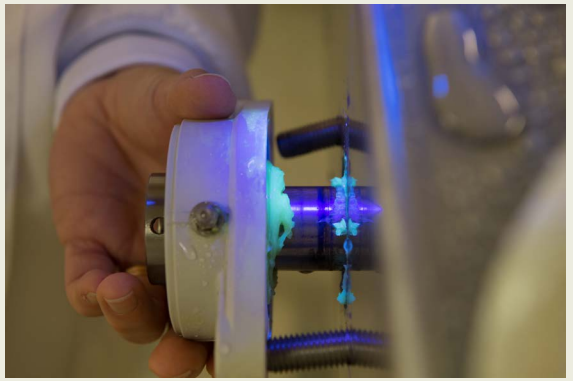
Purchasing stainless steel machines labeled “food grade” or installing special workarounds, such as trays that catch dripping grease or spacer-mounted bearing units, doesn’t necessarily mean safe or clean operations.

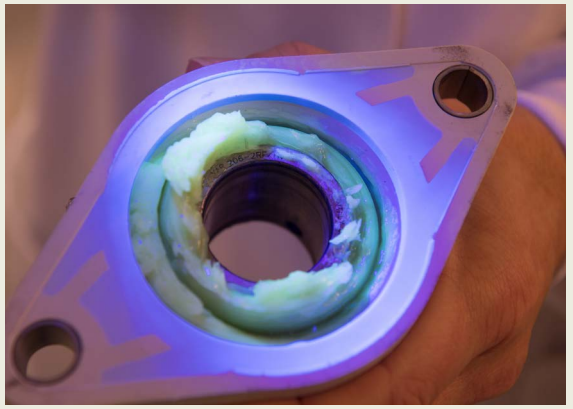
To truly align your food-safety and production efforts, you need to think about how every component and action around the food zone impacts your business goals. For example, the purpose of bearing relubrication in food-processing equipment is to increase reliability. This, however, can have a negative impact on your general food-safety practices in the form of expelled bearing grease and the risk of contaminating food zones.

Or think about the scenario discussed on the previous page: replacing a conveyor belt with one that is hygienically designed is a potential significant step toward increasing food safety.

But because no consideration was given to the associated components (e.g., the bearing units) being hygienically designed as well, it created the potential for bacterial contamination.

Once you examine your equipment and processes in these micro and macro ways, you’re able to extend **hygienic-design thinking to every component with regard to proactive food safety**, whilst uncovering new ways to achieve your production, TCO, and sustainability goals.





Even when organizations mount ball bearing units with spacers—due to a perception that cleanability behind the unit will improve—food-processing residues still accumulate, because it is hard to angle the water jet for complete elimination during wash-down. Additionally, the excess grease that results from following a “greasing to purge” regime is also difficult to remove completely.

What if you could...?

Coming up with new ways to solve both food safety and production challenges is never easy, especially when you also have to take equipment costs and environmental sustainability goals into account. There's also the fact that you often don't know what you don't know—that is, until you've achieved some new insight into how individual components, such as bearing units, are putting your larger goals at risk.

But what if you could proactively achieve food safety, while also...

Reducing bacteria and allergen traps around the food zone?

Increasing production uptime?

Eliminating relubrication maintenance needs and related costs?

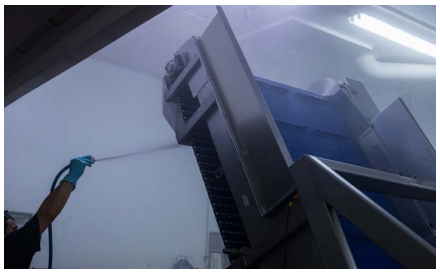
Reducing environmental waste?

Reduce bacteria and allergen traps around the food zone

You have a variety of safety practices in place to protect your food product. These might include simple things like posted signs encouraging employees to wash hands to larger-scale ones like the hygienically designed conveyor purchase or various upgrades mentioned earlier. And, of course, you employ a regular cleaning and disinfecting regime.

The problem is, traditional relubrication, wash-downs, and dry cleaning of bearings can actually create hidden means by which contaminants travel and thrive. Below are some examples:

Food residue – Food residue can get behind the bearing housing during processing and cleaning, and if the surface doesn't dry properly, it fosters bacteria growth.



Aerosols – Small droplets that contain food particles, grease, and bacteria can stay in the air for hours and settle back on the food zone after disinfection is complete.

Wastewater – While most bacteria may be killed during cleaning, some may be washed into the wastewater system.

Contaminated grease – Bacteria-infected bearing grease can be spread toward the food zone during pressure cleaning—even after disinfectant is washed away before production starts.

Just how far can bacteria and allergen contaminants travel as a result of routine cleaning procedures?

As these numbers show, wet cleaning via high- and low-pressure hoses disperses droplets the farthest—as many as 3,000 mm and 7,000 mm in distance.

However, dry-cleaning techniques, such as manual brushing, vacuuming, and compressed air, also disperse particulate matter far enough to be a food safety risk—depending on the proximity of the various bearings to the food zone.

Dispersal of particles and droplets by range of wet and dry cleaning techniques[5)]

Cleaning technique	Wet droplet dispersion		Dry particulate dispersion	
	Height	Distance	Distance	Width
	mm			
High-pressure/low-volume spray lance	3 090	7 000	–	–
Low-pressure/high-volume hose	2 100	3 500	–	–
Floor scrubber/dryer	470	800	–	–
Manual brushing	240	750	850–1 000[4)]	0
Manual wiping	230	450		
Vacuum	–	–	300	30
Compressed air	–	–	> 1 500	1 150

To improve your food-processing hygiene and compliance with food-safety regulations, you need to:

- Eliminate contaminant traps with completely sealed and hygienically designed bearing units that promote self-draining and deter soiling, regardless of mounting orientation.
- Reduce the spread of bacteria and allergens with relubrication-free technology that eliminates grease leakage and spreading to food zones and wastewater systems during hygienic cleanings.
- Use food-grade and food-safe components throughout your bearing units—from the material of the housing to the lubricated-for-life bearing grease, which should be allergen-free and food-industry certified.

Increase production uptime

Downtime comes in many forms. Planned downtime is often utilised for relubrication and cleaning purposes, or to perform other necessary maintenance tasks.

Then there's unplanned downtime, which can result from things like food contamination or asset reliability issues. For example, what happens when workers miss lubrication points through simple human error or the pipes within automatic lubrication systems become clogged? These can lead to system faults that interrupt production. Yet while unplanned downtime can have a major impact on your output—and thus your bottom line—the majority of it is avoidable.

To reduce downtime of all types and maximize your production uptime, you need to:

- Increase line efficiency by reducing the reliability issues stemming from ineffective bearing lubrication.
- Decrease bearing cleaning time and effort.
- Eliminate relubrication downtime.
- Choose hygienically designed components with optically detectable housing and sealing parts to limit potential for food contamination.

Eliminate relubrication maintenance needs and related costs

When it comes to maximizing business performance, F&B executives are always looking for new answers to questions like “How can we reduce TCO?” and “How can we increase line efficiency?”

For the former, they might try to reduce direct costs by sourcing cheaper machine components, but that discounts the large indirect costs that result when unexpected failures occur, impacting production.

When it comes to asset reliability, they often rely on lubrication strategies designed to maximize the life and performance of rotating components. However, frequent relubrication can negatively impact cost-cutting measures by increasing associated costs, such as for the lubricant itself, the labor to apply it, and the consumable resources needed for cleaning.

Consider the number of bearing positions in your operation, and use the numbers below to estimate how much you could save on lubricants per year—both directly and indirectly via labor required to relubricate.

Average lubrication requirements per 100 bearing positions, for each maintenance period

- Per bearing purge – 15 g *(0.53 oz.)*
- Per weekly maintenance cycle – 1,5 kg *(3.3 lbs.)*
- Per year – 78 kg *(172 lbs.)*

To improve TCO in your food-processing operations, you need to:

- Reduce maintenance costs by eliminating the need for relubrication of bearing units—and the associated labor and consumables costs.
- Decrease downtime costs by eliminating planned downtime for relubrication and avoiding unplanned downtime due to food-line contamination, bearing unit faults, or worker injuries.
- Lower environmental costs by requiring less heated water to clean excess grease off bearings, and saving the cost of purchasing and disposing of grease absorbents.

Reduce environmental waste

You know that effective lubrication of machine components is key to asset reliability. But have you considered how frequent relubrication of bearings and cleaning of excess bearing grease can actually impact your sustainability efforts?

For example, the dry hand cleaning of bearings can generate grease-contaminated materials, such as gloves, cloths, and paper towels—all of which require incineration. And in the case of wash-downs, excessive grease (due to bearing purge) is being cleaned off bearings, entering the wastewater stream. There's also the impact to your carbon footprint as energy is consumed to heat and use water for bearing unit cleaning, produce and dispose of grease absorbents, and so on.

An employee dry cleans grease from a bearing with a cloth that will ultimately be incinerated.

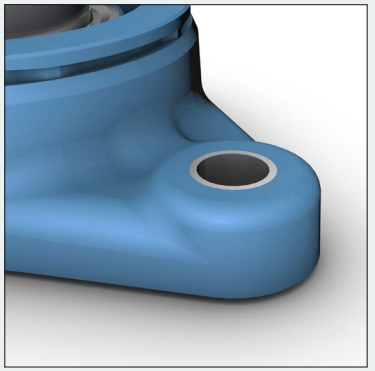
To improve sustainability throughout your food-processing lifecycle, you need to:

- Reduce or eliminate the need for bearing relubrication, so you'll use less grease, water, and energy, fewer paper towels and cloths, and limit unnecessary contaminants in your wastewater.
- Find new ways to shrink your carbon footprint—for example by extending the useful life of your bearings and reducing energy consumption through low-friction seals.
- Choose components that can be 100% recycled or reused, contributing to zero-landfill targets.
- Overall, accelerate your journey from a disposal-to an avoidance-oriented culture.

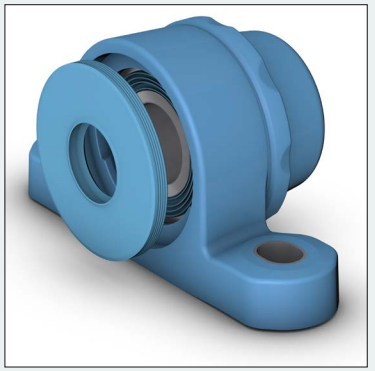
Extend hygienic-design thinking to every component with SKF

SKF's new Food Line ball bearing units have been specifically designed and engineered in all elements to uniquely address food and beverage industry requirements around food safety, uptime, cost efficiency, and sustainability.

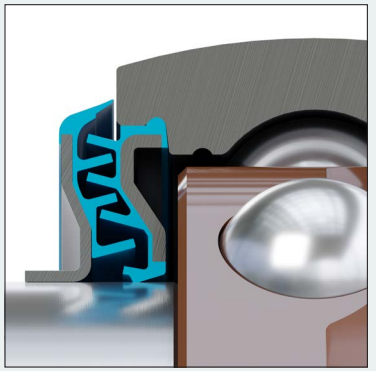
Through SKF's ground-breaking advancements in bearing unit hygienic design, relubrication-free technology, and increased performance engineering, you're able to extend hygienic-design thinking to many more components within your food-processing operations, helping you achieve your most critical safety and performance goals. Key features include:



Hygienically designed housing for improved cleanability.



Completely sealed unit—nothing gets in or out.



Patent-pending sealing system that works with the cleaning media, as opposed to completely excluding it, to prevent ingress and damage.

For more information:

Your authorised distributor is:

Acorn Industrial Services Ltd
Tel: 0800 8766 441
Email: enquiries@acorn-ind.co.uk

Download the brochure:
Learn how SKF's Food Line ball bearing units can fulfill food safety and uptime requirements and reduce costs and environmental impact.

Download the catalog:
Learn more about the unique technology that powers SKF's new Food Line ball bearing units.

www.skf.com/foodandbeverage

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1) Food Safety Tech Staff, "FDA Food Recalls Up Nearly 93% Since 2012," Food Safety Tech, Feb 16, 2018.
2) Stericycle, "Recall Index," Q4 2017.
3) Allianz, "Product recall risks growing in size and number, as technology drives new triggers, warns Allianz," Dec 5, 2017.
4) 85-100 cm for soft and hard bristles, respectively.
5) RISE Research Institutes of Sweden AB, "Hygiene and cleanability of SKF bearings intended for food and beverage – secondary research," December 7, 2017.