

# RESILIENCE IS PROFITABILITY.

Are Your Motors up to the Challenge?

**#1** cause of premature motor failure: Ingress of water and chemicals.

Estimated cost of unplanned downtime  
**\$30,000 per hour**

Source: "Motors Help Baking Equipment Reduce Factory Downtime," Food Quality and Safety.

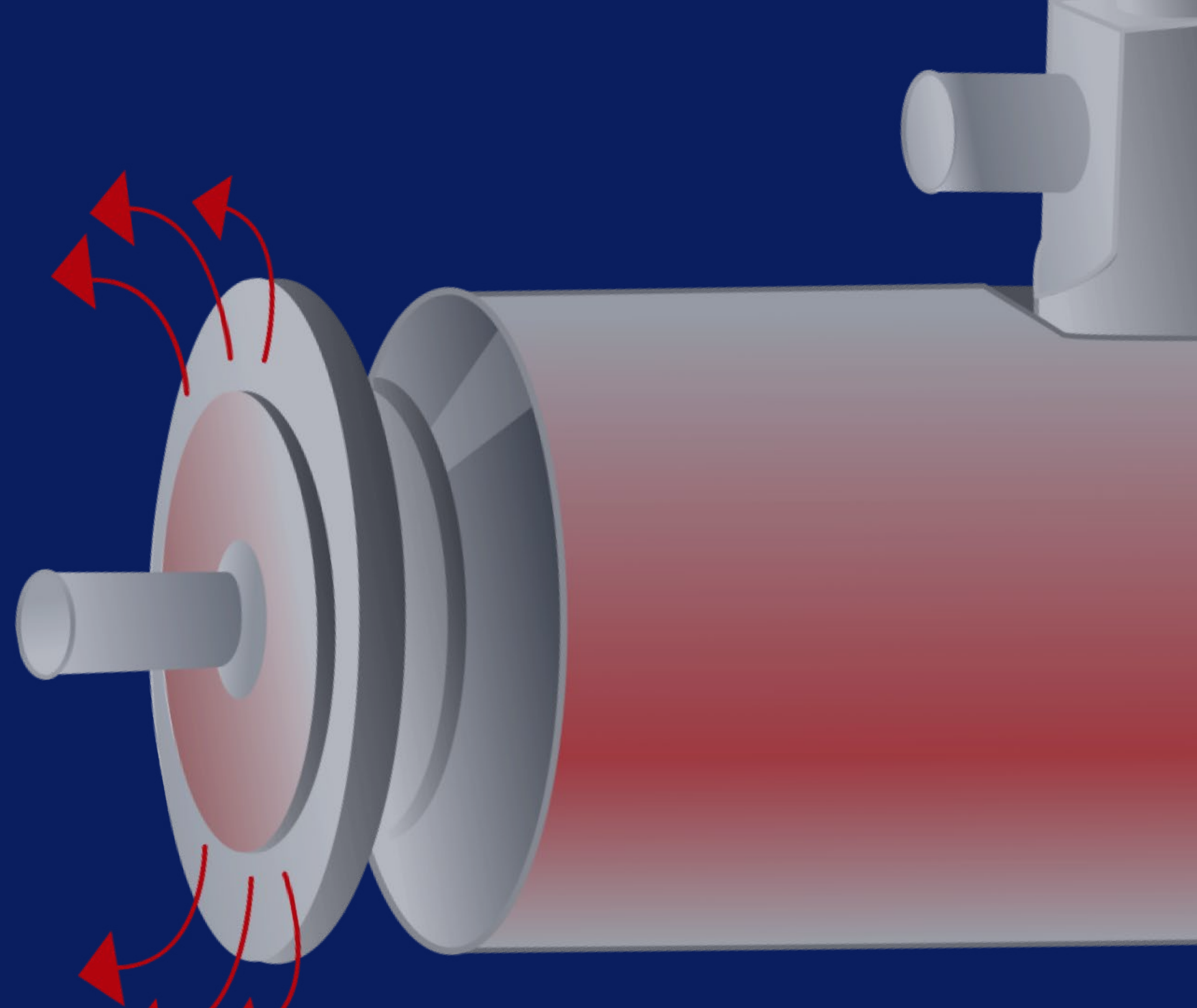


Regular, thorough equipment cleaning is essential to food safety.

## HOW DO WATER AND CHEMICALS GET IN?

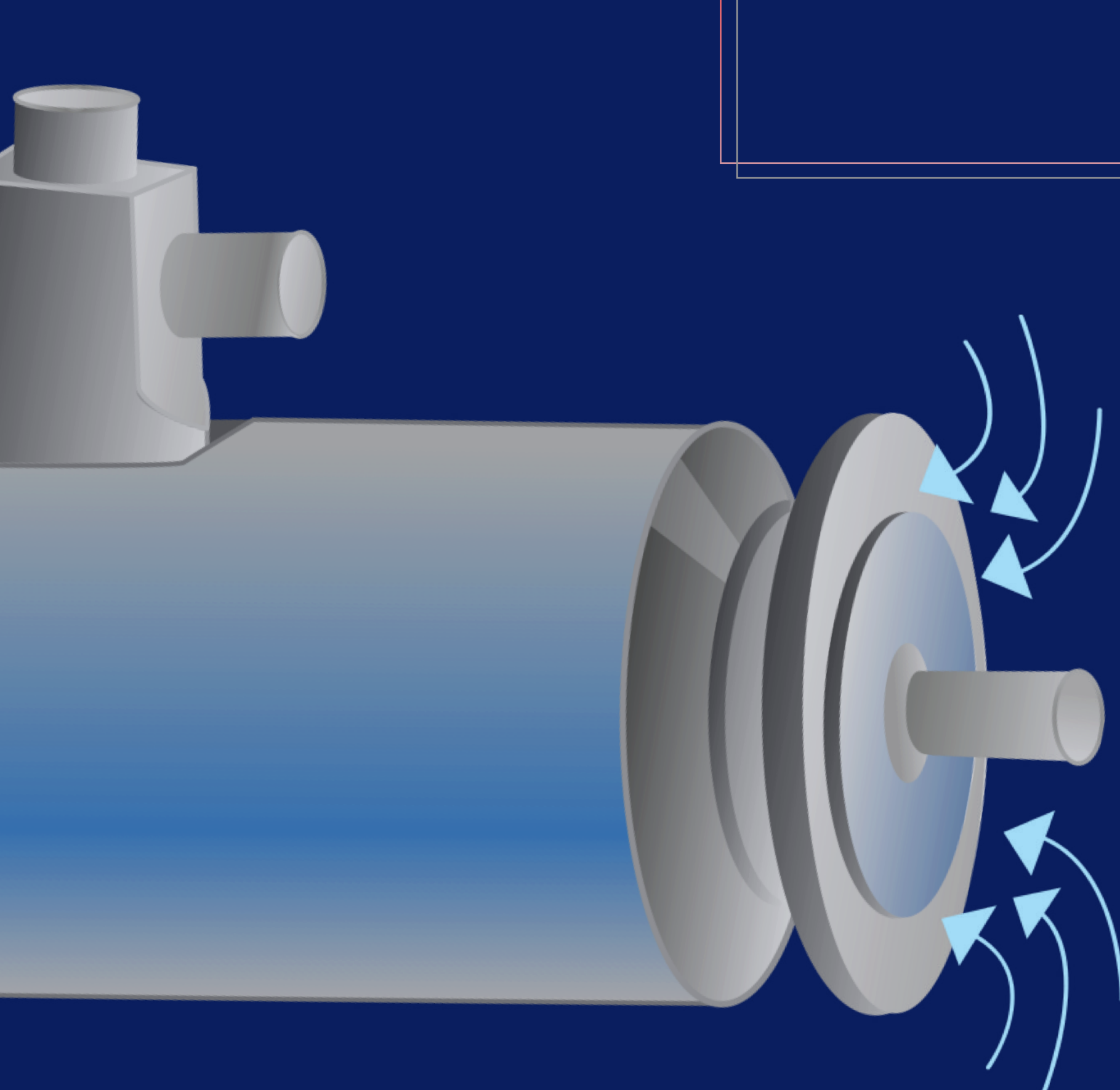
Internal operating temperature can exceed 100°C (212°F)

Pressure rises with temperature, pushing gases out past the seals.



Following operation, temperature returns to ambient—in a refrigerated environment, as low as 0°C (32°F).

Internal pressure can drop by 5.5 PSI relative to ambient pressure, pulling water and corrosive chemicals in past the seals.



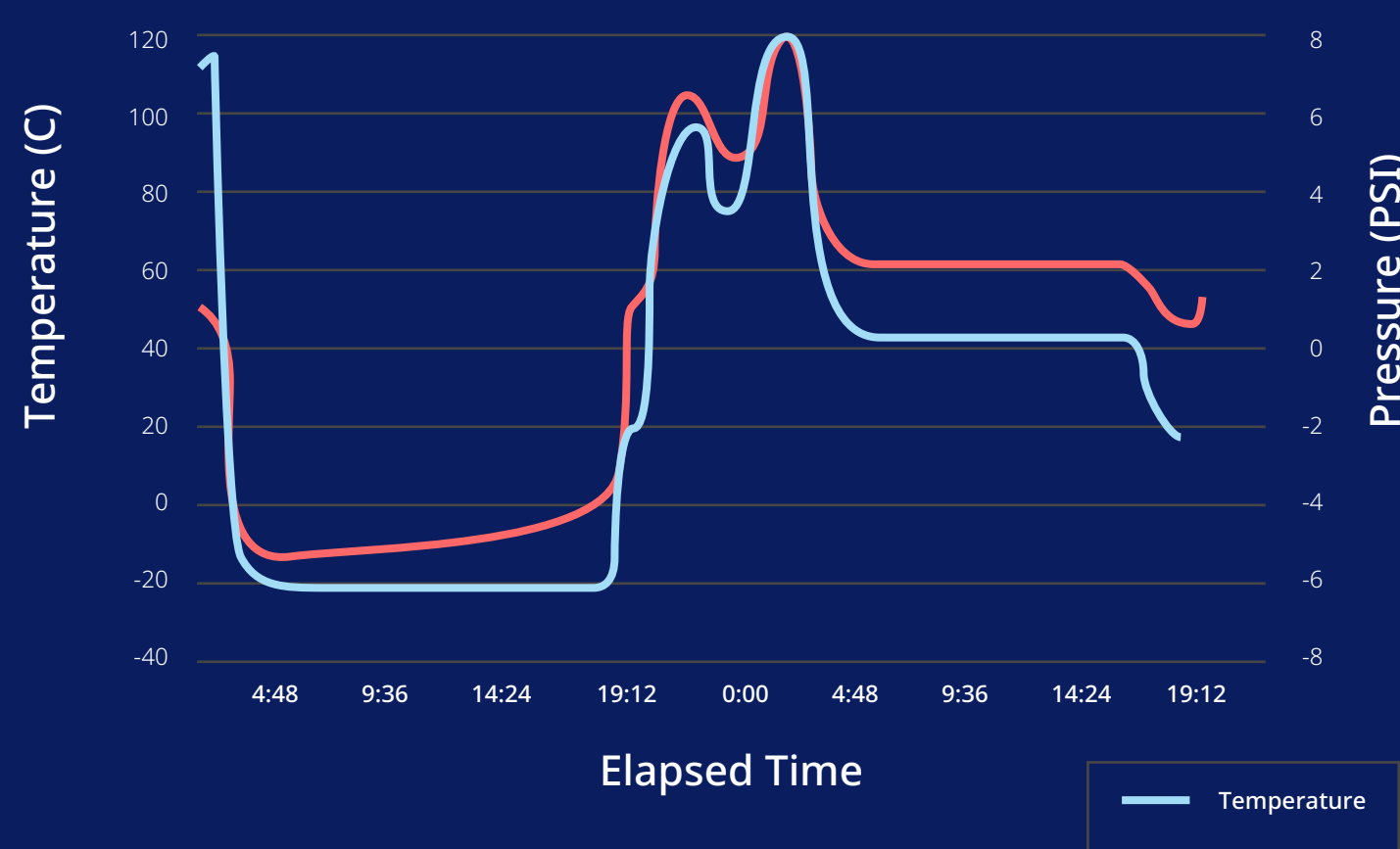
Water and chemicals can quickly destroy precision motor bearings!

## HOW CAN YOU MINIMIZE THE RISK OF PREMATURE FAILURE?

### An incomplete option: Sealed motors

- Well-sealed motors are essential in a washdown environment.
- However, no seal is completely impervious.
- Falling internal pressure can draw water and chemicals past the seal.

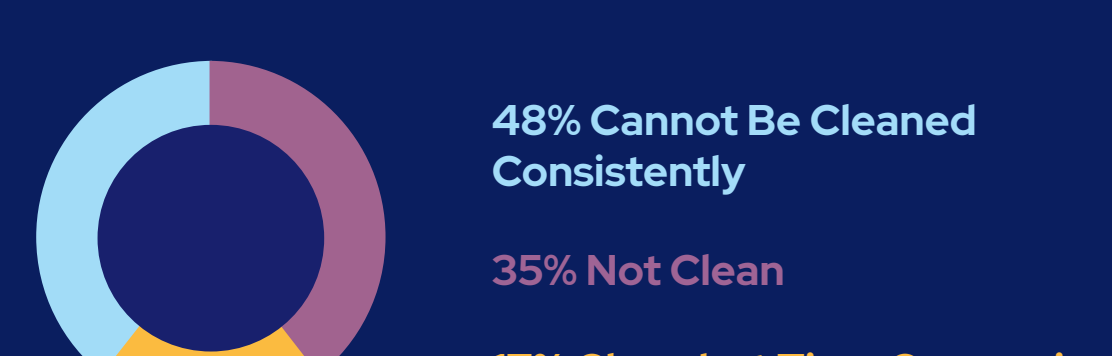
Internal pressure in a "sealed" motor varies with operating temperature.



### A questionable option: Physically isolated motors

- Permanent covers encourage hidden pathogen growth.
- Bagging motors is time consuming, and employees often skip it.
- Covers/bags can leak, and they must be removed for wipe-down.
- Manual wipedown of motors is time consuming and in many cases ineffective.

How clean are components that are bagged and wiped rather than washed down?



Source: Kollmorgen survey of 23 leading food safety professionals

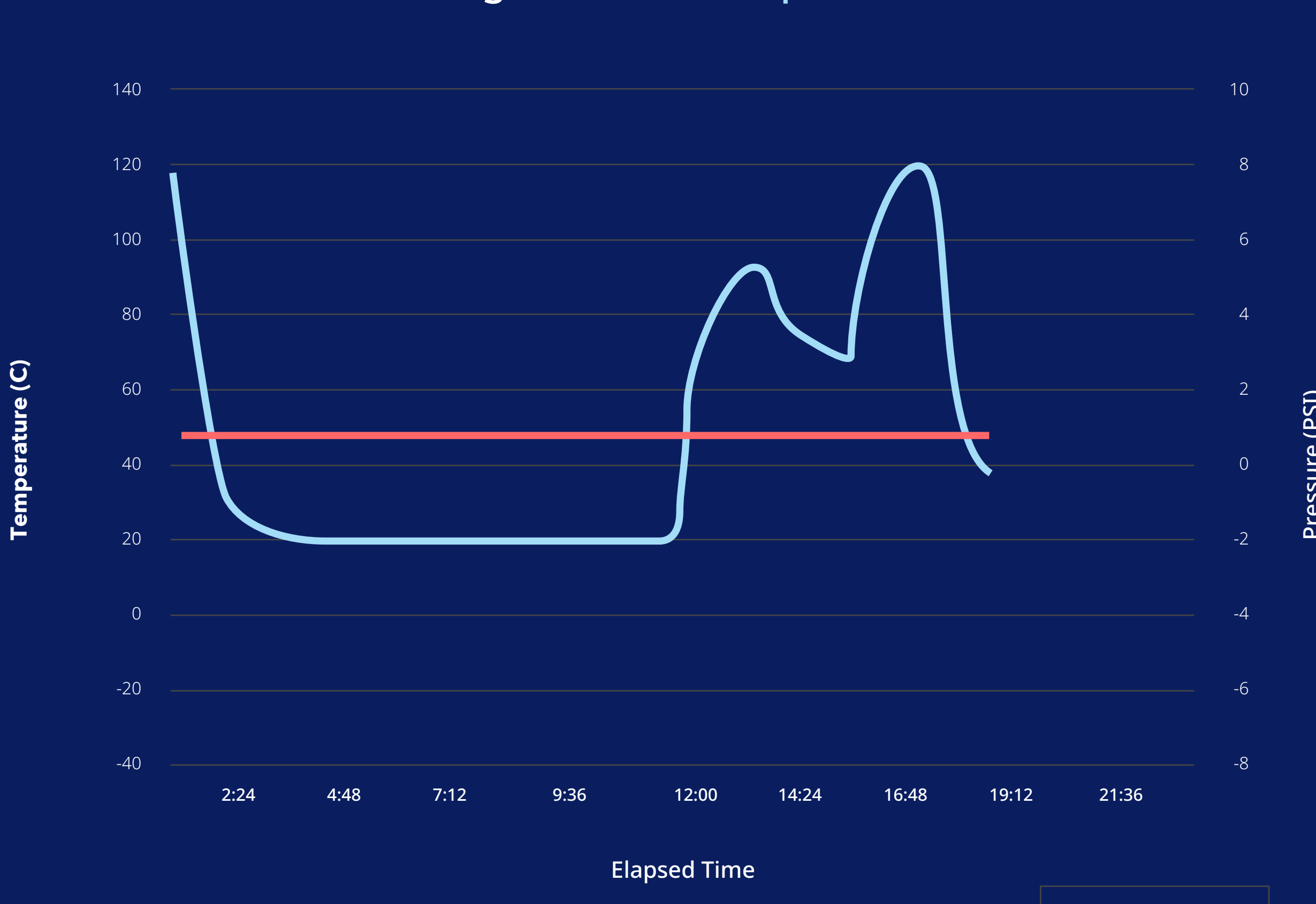
### An acceptable option: Positive air pressure system

- Positive internal pressure is maintained by injecting clean, dry air.
- Requires an air compressor with tubing to each motor.
- Requires additional motor connections that are difficult to clean.
- Installation is time consuming.
- System introduces multiple points of potential failure, including contaminants from injected air.

## THE IDEAL OPTION: VENTED SYSTEMS FROM KOLLMORGEN

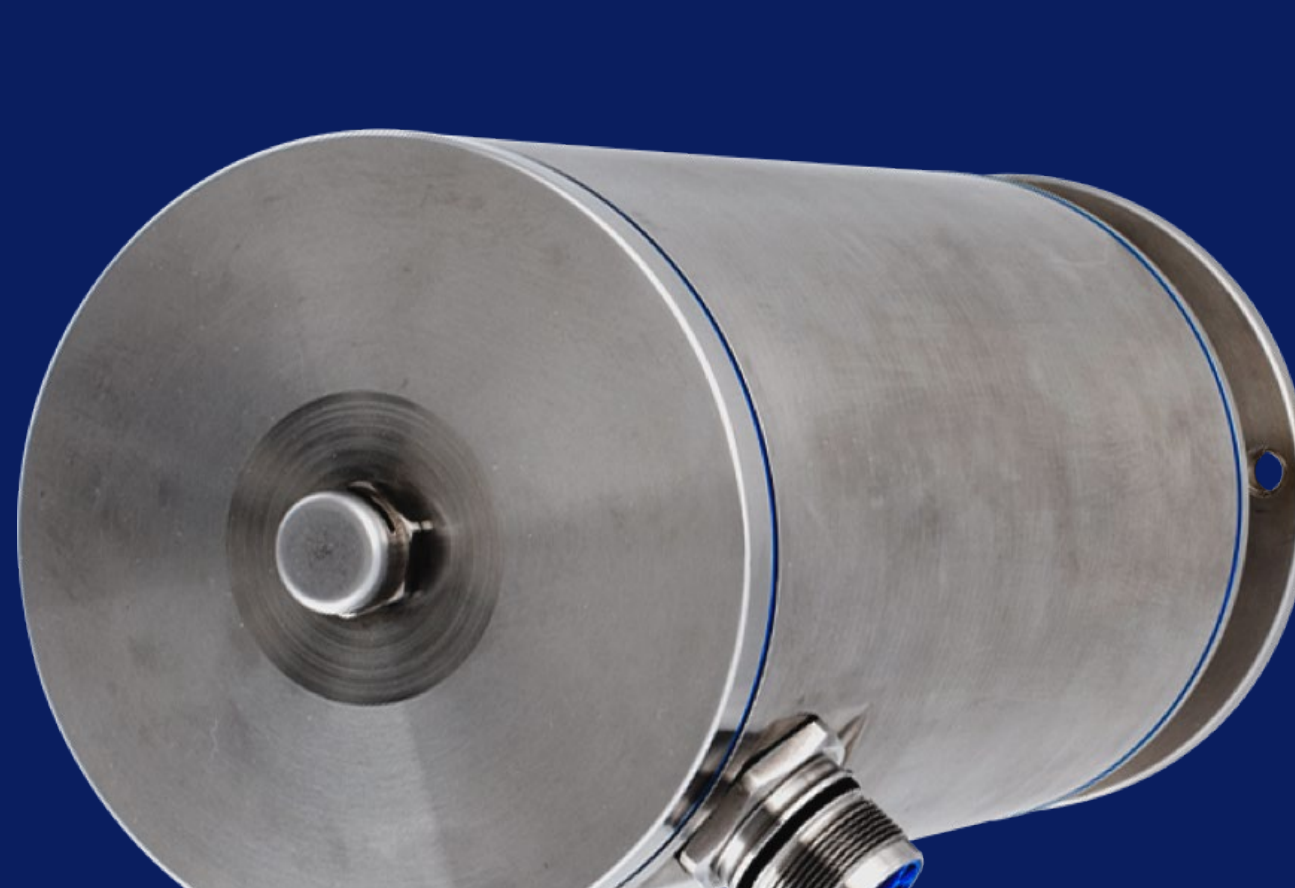
Continuous pressure equalization eliminates the risk of internal vacuum. Kollmorgen provides three venting options.

Vented designs equalize internal motor pressure regardless of temperature.



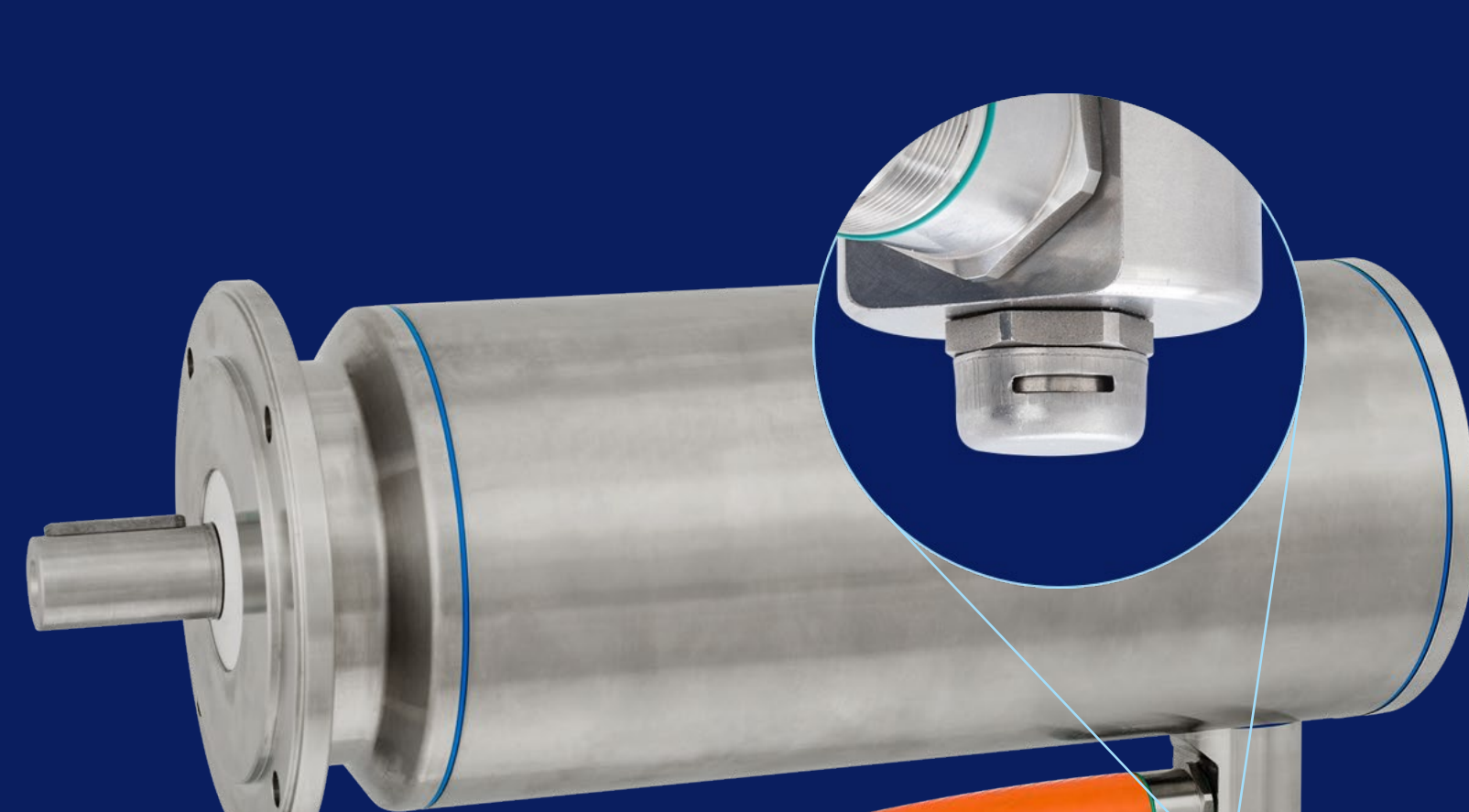
### KOLLMORGEN VENTED MOTOR DESIGN

- A breather port is installed directly on the motor.
- Allows continuous pressure equalization.
- Gore membrane prevents ingress of contaminants.



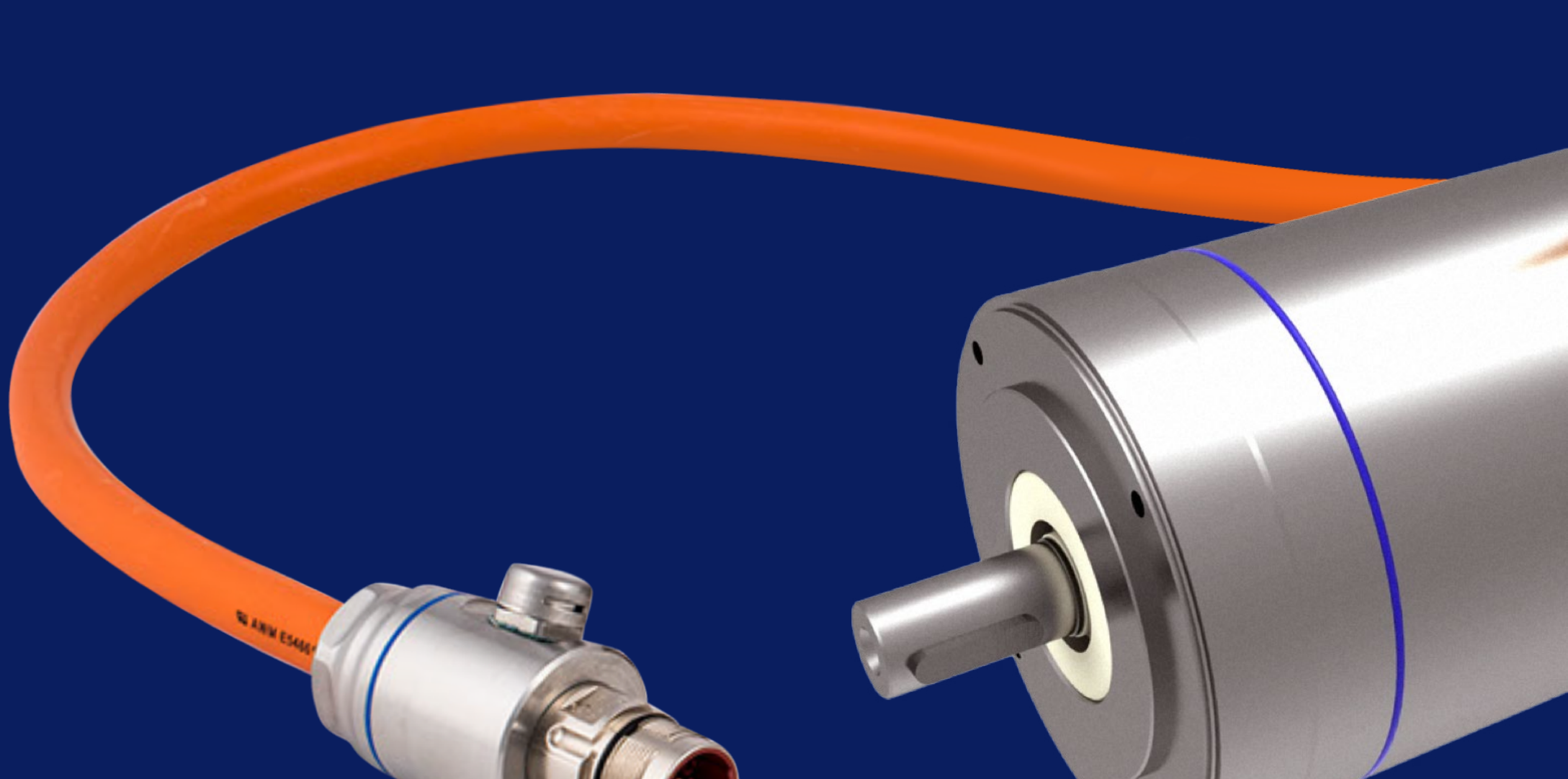
### KOLLMORGEN PATENTED VENTED CONNECTOR DESIGN

- Breather port and Gore membrane integrated with motor connector.
- Allows continuous pressure equalization.
- Simple design for easier motor cleaning.



### KOLLMORGEN PATENTED VENTED CONNECTOR DESIGN

- Power/data cable also includes tube for motor venting.
- Allows continuous pressure equalization.
- Easiest system to install and clean.



Venting for pressure equalization is just one of the ways our 316L stainless steel AKMH Series delivers reliable performance in hygienic washdown environments.

Learn more about washdown efficiency and motor reliability at [www.kollmorgen.com/washdown](http://www.kollmorgen.com/washdown)