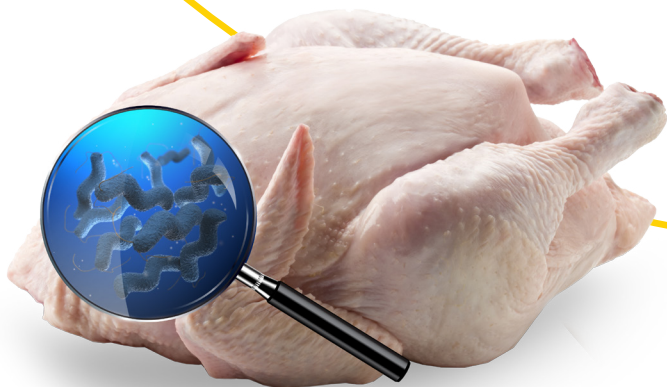


Freshline[®] SafeChill[™] System for Poultry

The safe, effective and proven
solution for campylobacter
intervention



Campylobacter, a challenge for the poultry industry

According to the European Food Safety Authority (EFSA) the Campylobacter bacteria causes around 200,000 reported human cases of campylobacteriosis every year in the EU. The actual number of cases (reported and unreported) are believed to be more around 9 million each year. This is the most frequently reported food-borne illness in the EU and is estimated by the EFSA to have a cost of around 2.4 billion a year in lost productivity and public health solutions.

Why use the Freshline® SafeChill™ system?

Highly effective: This indirect chilling intervention after evisceration reduces the campylobacter counts to acceptable levels. It can be used alone or to complement another intervention ensuring industry acceptance at all times.

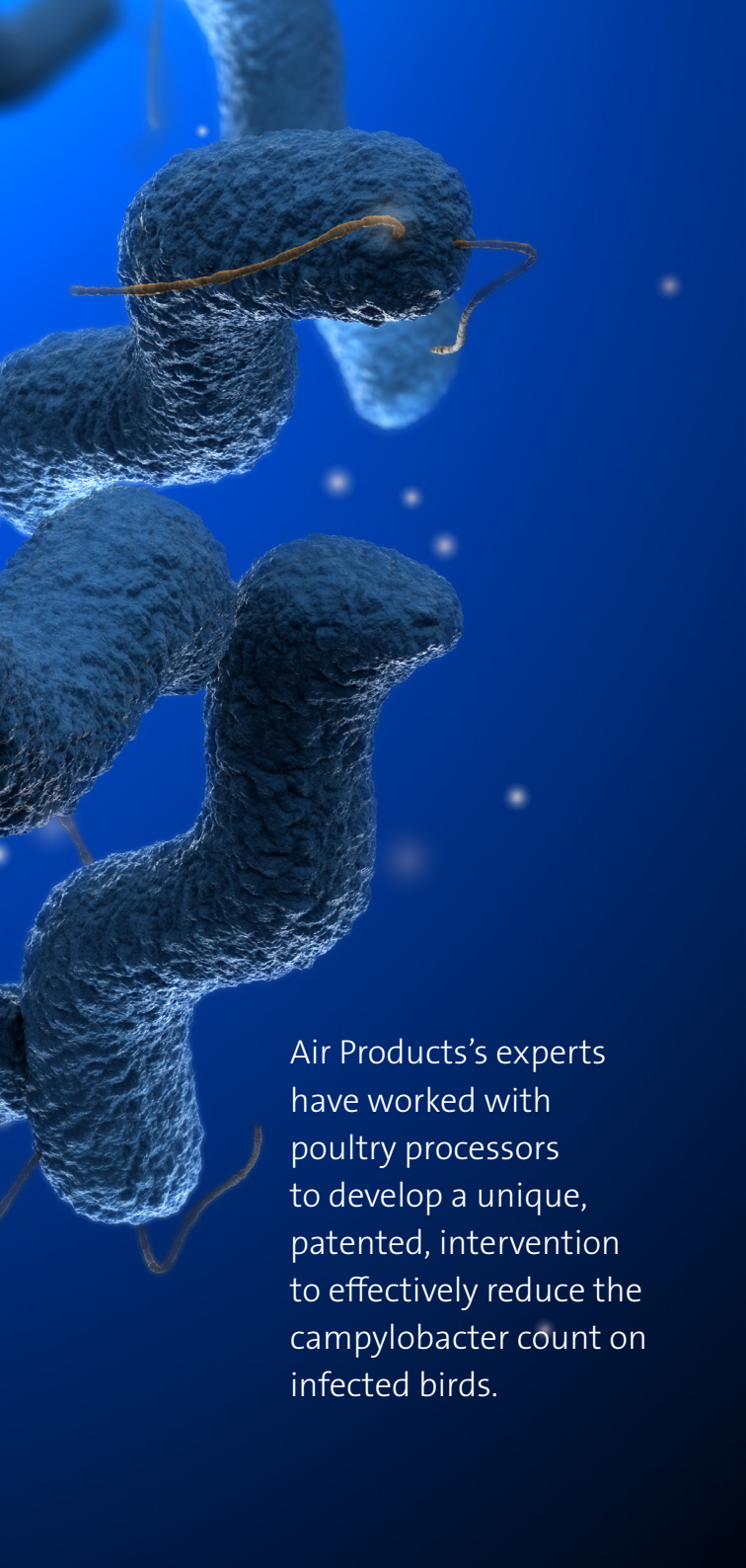
Customisable: Modular & automated set up allowing to operate 3 shifts a day and to meet current and future production line speeds. Easily integrated in any production facility.

Safe: Safe in terms of operations.

Quality preserving: The quality of the product remains the same.

Precise: Precise temperature control and setup based on your needs.

Treatment time: 30-50sec.



Air Products's experts have worked with poultry processors to develop a unique, patented, intervention to effectively reduce the campylobacter count on infected birds.

How does it work?

The birds enter the Freshline® SafeChill™ zone on the shackle. In this area, the air has been super-chilled by means of Liquid Nitrogen passing through a heat exchanger. The birds' surface is rapidly chilled resulting in a significant reduction of the campylobacter bacterium presence. After 30 to 50 seconds dependent on the needs, the birds exit the chamber and their surface immediately recuperates to room temperature, without any damage to the skin and meat quality.

The Freshline® SafeChill™ system ensures optimal efficiency by re-circulating the super-chilled air.

A process temperature is set, with variable air velocities to adjust treatment intensity.

Air Products takes care of the site installation, commissioning and training, project management and engineering.

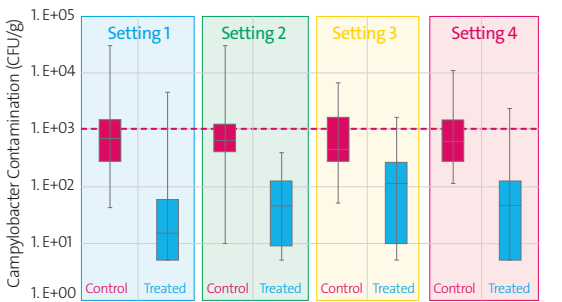


A proven intervention at industrial scale

Air Products' R&D team trialed multiple settings for the Freshline® SafeChill™ intervention. Comprehensive testing and data evaluation allowed the identification of the most effective SafeChill™ settings.

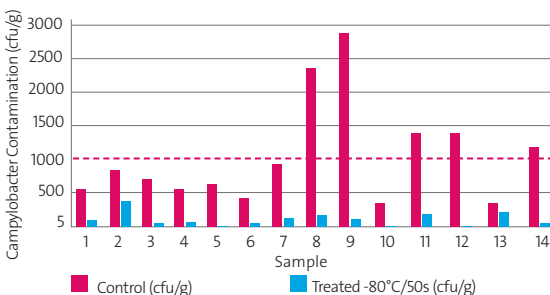
You can see here boxplots of exemplary results of different SafeChill™ treatments tested on 100 carcasses per setting.

Figure 1: Boxplots for control & treated sample groups using different FSC settings N=100birds/control and N=100birds/treated



Once the final settings were fine tuned, various carcasses were tested before and after the SafeChill™ intervention. All samples were sent to an independent laboratory for analysis. You can see the results provided by the laboratory in **Figure 2**.

Figure 2: Before (magenta) and after (blue) comparison of treated birds showing the effect of the Freshline® SafeChill™ system.



About Air Products

Air Products' Freshline solutions offer you the high-purity gases and equipment, the international supply capability, and – most important – the unmatched industry experience and technical support to help you succeed just about anywhere in the world. We can help you improve your productivity, lower your costs, maximize your returns, and, as a result, allow you to continuously grow in a very competitive market.

Next to our standard applications, we also offer custom made solutions to ensure your needs are met and your expectations reached, always.

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