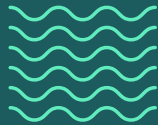


# Water reduction for clean-in-place operations using vortex rings



## Expertise and domain knowledge

- Consumer
- Industrial
- Applied science
- Computer modelling
- Simulation
- Fluid flow
- Sensors





## Our client asked:

Sagentia Innovation works with leading businesses across the industrial, food and beverage, consumer, and medical sectors. Clients across a number of sectors have asked us how they can contribute to water reduction in manufacturing.

## The project story:

Sagentia Innovation addressed the challenge by looking at one of the most significant contributors to water consumption in manufacturing processes; cleaning-in-place (CIP) systems based on detergent washing, water rinsing and hot water sanitisation. The primary objective identified was to find a way to reduce the water required for rinsing.

A short list was drawn up from many innovative ideas based on feasibility and impact. Of these ideas, the application of vortex rings was chosen for further development into a concept and our research found that:

- Vortex rings' internal rotation creates movement from the outside to the inside of a doughnut-shaped feature
- Vortex rings could therefore improve mixing within the flow of water through a pipe by drawing material from the pipe walls into the centre
- The water flow rate and volume used would therefore be reduced while still achieving the effective removal of residues from the pipe walls

The concept was modelled using COMSOL simulation software to explore the likely effectiveness and energy required and initial indications are that this approach is likely to be feasible for this application.

## Results: deliverables and outcomes

Sagentia Innovation showed that a vortex ring could survive in a pipe and can travel in a background flow. As such, this concept could be the first step in a development journey towards significant reduction in water consumption for cleaning-in-place systems.

## Contact us

[info@sagentiainnovation.com](mailto:info@sagentiainnovation.com)

+44 1223 875200

[sagentiainnovation.com](https://sagentiainnovation.com)