Cleaning a spent grain container without stopping production

In a brewery, an automated CIP system with food grade components eliminates manual access to confined spaces



INDUSTRY
Food and beverage industry

APPLICATION
Tank cleaning | CIP

PROBLEM
Automated cleaning of the spent grain container of a mash filter in a food grade environment

SOLUTION
UKD retractable tank washing heads on two independent washing lines

INDUSTRY BACKGROUND

Cleaning spent grain containers in the brewing process

In beer production, **the mash filter separates the wort from the spent grain (also known as brewer's spent grain or draff)**. The spent grain is collected in a dedicated container, where a screw conveyor conveys the material towards the discharge outlet.

At the end of each production cycle, the internal walls, the screw and its supports become coated with dense, sticky organic residues. **In a food grade environment, cleaning these spaces must comply with stringent hygiene standards and ensure the absence of cross-contamination between one cycle and the next.**

The irregular geometry of the container, the presence of internal mechanical components and its large overall dimensions make manual cleaning discontinuous, slow and difficult to standardise.

The optimal solution in these contexts is a CIP (Clean-In-Place) system with retractable washing heads, capable of operating inside the container automatically and reproducibly, without requiring physical access by operators.

THE CHALLENGE

A brewery required its mash filter to be equipped with an automated cleaning system for the spent grain container.

The container had a rectangular footprint of 10,100 × 2,750 mm with a V-shaped cross-section (depth ranging between 2,000 and 2,500 mm), and was fitted internally with a horizontal screw conveyor and three structural supports, whose lower face was particularly difficult to reach.

The operating conditions introduced an additional constraint: **the nozzles were required to remain fully closed during the spent grain discharge phase, to prevent blockages caused by the organic material.**

The system also had to comply with the hygiene requirements specific to a food grade application.

THE BREWERY ASKED US TO **CLEAN THE MASH FILTER SPENT GRAIN CONTAINER** WITHOUT STOPPING PRODUCTION

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OUR SOLUTION

PNR Italia carried out a dedicated coverage study, analysing the container geometry and operating conditions to define the number, position and configuration of the washing heads.

The solution comprises eight retractable washing heads from the UKD family, distributed across two parallel lines, with a combined flow rate of 360 + 360 lpm at 3 bar.

The choice of retractable washing heads directly addresses the operational requirements: **in the closed position, the nozzles are not exposed to the spent grain during the discharge phase and present no risk of blockage.** Opening occurs exclusively during the cleaning cycle.

The two lines are activated sequentially rather than simultaneously, to ensure complete coverage even of the least accessible areas of the V-shaped geometry.

For cleaning the lower face of the screw conveyor supports — an area not reached by the main washing heads — the project includes the integration of dedicated supplementary nozzles, to be incorporated into the final plant layout.

OPERATING PARAMETERS

720 lpm	3 bar	500 mm
Total flow rate	Operating pressure	Washing head stroke

KEY BENEFITS

• **Complete coverage in a food grade environment.**
The coverage study made it possible to design a system that treats the entire internal surface of the container — walls, base and areas around the screw — in compliance with the hygiene standards required by the food industry.

• **No interference with the production process.**
The UKD retractable washing heads remain closed during the spent grain discharge phase, eliminating the risk of blockage and mechanical damage.

• **Automated and reproducible cleaning.**
The CIP system replaces manual operations in confined spaces, reducing plant downtime and ensuring consistent results with every cycle.

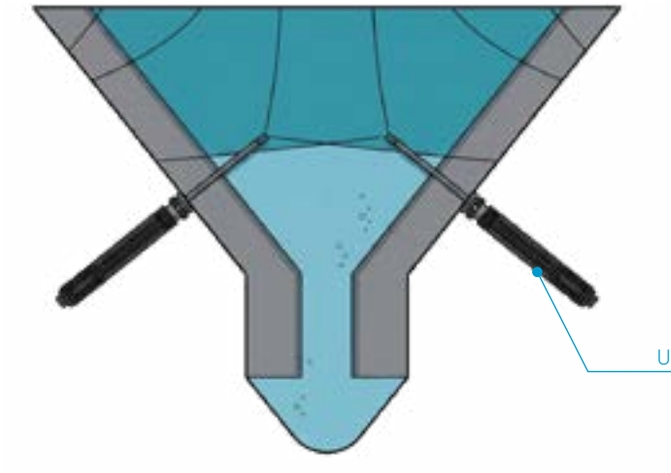
• **Custom engineering for complex geometries.**
PNR Italia's approach — based on a dedicated coverage study — made it possible to address an application with non-standard structural characteristics, tailoring the solution to the actual specifics of the container.

PRODUCT SPOTLIGHT

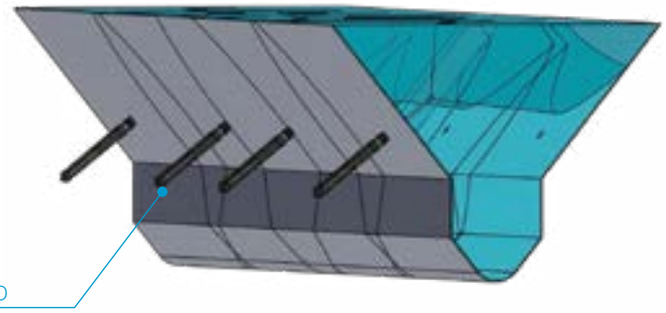


UKD
FREE-ROTATION
TANK WASHING HEAD

The UKD washing head offers efficiency, extreme flexibility and ease of operation. It works via pneumatic or CNC actuation, taking up less space than conventional fixed steel structures. In the closed position, it is fully protected from the product in the tank, making it ideal for applications where process continuity and hygiene are critical requirements.



SPENT GRAIN CONTAINER WITH UKD INSTALLED
CROSS-SECTION VIEW



SPENT GRAIN CONTAINER WITH UKD INSTALLED
CUTAWAY ISOMETRIC VIEW

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