RONNINGEN-PETTER®

Solutions for Clean In Place (CIP) loop filtration.

MECHANICALLY CLEANED FILTER SOLUTION

☑ Reduce Overall Caustic Consumption

- Remove spent process waste automatically
  - Reduce caustic consumption
- Automatic, continuous debris removal for improved caustic retention
- Improve caustic wash effectiveness

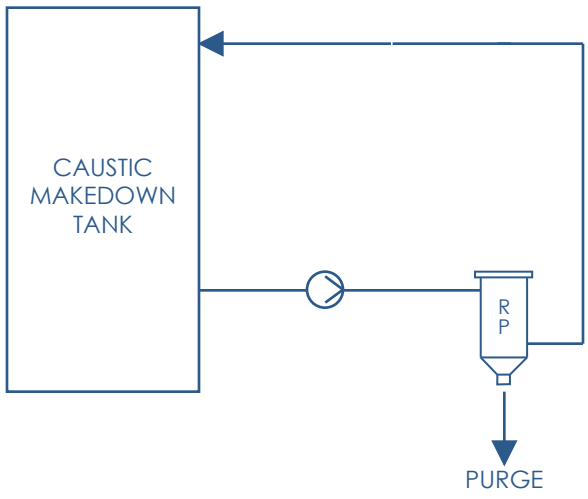
☑ Reduce Downtime

- Prevent plugging
  - Heat exchangers, spray balls, nozzles & showers
- Designed to handle upset conditions
- Robust construction
  - All wetted materials are 316 Stainless Steel

☑ Reduce Human Interaction

- All functions automatic and controllable
  - Cleaning and purging when process dictates
- Designed for 24/7 operation
- OSI control language capable

RECYCLE LOOP



ROI in less than 9 months

CIP Loop Filtration

RONNINGEN-PETTER®

Solutions for CIP loop filtration.

A Midwest ethanol producer was experiencing high fluctuations of caustic use without a strong correlation as to the problem's source. The plant had several theories and after consulting with Ronningen-Petter, a plan was developed.

The resulting solution was to install an automated, mechanically cleaned filter on a recirculation loop connected to the caustic make down tank. The current CIP loop was not interrupted and continued to operate as normal.

Within days of the installation, the filter had stabilized the caustic addition rates. The filter, operating automatically, removed the particulate from the caustic tank, reducing consumption of caustic.

The installation of the Ronningen-Petter DCF Filter ensured a consistent CIP cleaning process every time. This technique allowed for the creation an improved system -- facilitating an increase in process uptime.

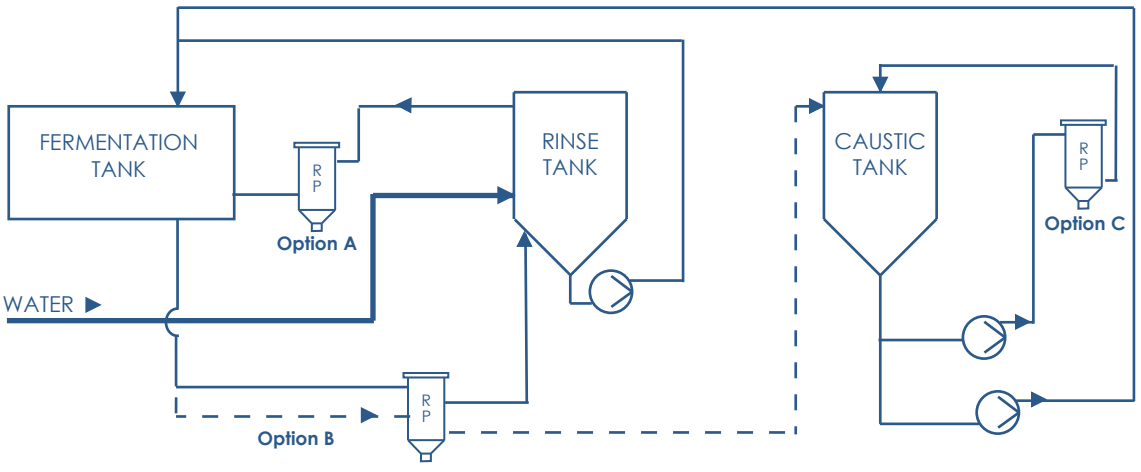
Mechanically Cleaned Filters

Ronningen-Petter mechanically cleaned filters are based on a simple concept:

Unfiltered liquids are fed through the inlet of a cylindrical stainless steel housing containing a filter screen. Solids are deposited on the interior surface of the filtration media, allowing filtered liquid to exit at the outlet. An interior cleaning disc travels up and down the screen -- based on time, pressure differential, or manual selection -- scraping off the debris.

This cleaning process happens while the filter remains in service, thereby maintaining process efficiency and dramatically reducing loss of valuable product. The accumulated solids are purged out of the filter on a regular basis, removing them in a concentrated form out of the process fluid.

CIP LOOP FILTRATION



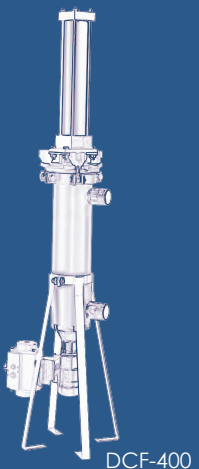
Option A: Two filtration points - one between the fermentation tank and the rinse tank, and a side stream filter at the caustic tank.

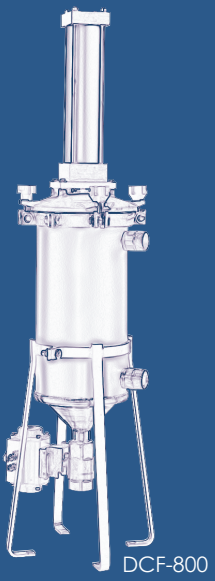
Option B: One common filtration point for the caustic tank and the rinse tank. Any fluid leaving the fermentation tank is filtered.

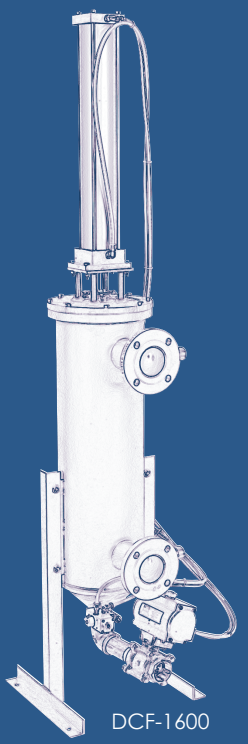
Option C: One filtration point on side stream of caustic.

= Mechanically Cleaned Filter with Permanent Media

= Pump


DCF-400


DCF-800


DCF-1600

For more information on how these filters can save you money, how they work and how to contact us, please visit www.rpaprocess.com/CIP.

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