



# Cactus Craft - Brewery Deep Cleaning Protocol

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The following procedure aims to address issues in a brewery where a persistent infection is suspected, and where a deep clean is called for. Some steps might not apply. Please get in touch should you have any questions or a specific case where a change of procedure, or further intervention is required.

## 1. Preparation

1. Stop Production:
  - Cease all brewing operations to focus on cleaning.
  - Segregate affected areas to prevent cross-contamination.
2. Protective Equipment:
  - Ensure all staff wear personal protective equipment (PPE): gloves, goggles, and appropriate cleaning attire.
3. Inspection:
  - Identify contamination sources (e.g., tanks, hoses, valves, or bottling equipment).
  - Test affected areas with microbiological swabs to confirm the extent of the infection.
4. Remove Ingredients:
  - Discard any raw materials (grains, hops, yeast) stored near the infection site.
  - Safely dispose of all beer or wort suspected of contamination.

## 2. Cleaning Process

### Step 1: Physical Cleaning

- Empty All Vessels:
  - Drain fermenters, bright tanks, and kegs completely.
  - Disassemble tanks, pumps, and valves.
- Remove Biofilms:
  - Use non-abrasive brushes and scrapers to remove visible debris, residues, and organic build-up on surfaces.
  - Pay attention to areas prone to harboring microorganisms: welds, gaskets, and blind spots.

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## Step 2: Detergent Cleaning

- Use an alkaline cleaner to break down organic matter such as proteins, sugars, and yeast residues.
    - Recommended product: Caustic soda (sodium hydroxide) or brewery-specific alkaline detergents.
    - Concentration: 1–2% solution.
    - Temperature: 60–80°C (140–176°F) for optimal effectiveness.
  - Recirculate through tanks, hoses, and pumps for 20–30 minutes.
  - Rinse thoroughly with hot water (minimum 70°C/158°F) until no detergent residues remain.
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## Step 3: Acid Cleaning

- Use an acid cleaner to remove beer stone (calcium oxalate) and mineral deposits, which can harbor microbes.
    - Recommended product: Phosphoric or nitric acid-based cleaner.
    - Concentration: Follow manufacturer recommendations (typically 0.5–2%).
    - Recirculate for 15–20 minutes.
  - Rinse thoroughly with hot water.
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# 3. Sanitization

## Step 1: Thermal Sanitization

- Use steam or hot water to sanitize tanks, fittings, and other equipment.
  - Temperature: 85°C (185°F) for 20–30 minutes.

## Step 2: Chemical Sanitization

- Apply a broad-spectrum sanitizer effective against *Brettanomyces* and *Clostridium*:
    - Recommended products: Peracetic acid (PAA) or iodine-based sanitizers.
    - Concentration: PAA (100–200 ppm) or iodine-based sanitizers as per the label.
    - Contact Time: Minimum 10 minutes.
  - Ensure all surfaces, including difficult-to-clean areas, are thoroughly coated.
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## 4. Special Considerations

1. Hoses and Gaskets:
    - Replace any hoses or gaskets with visible wear or microbial damage.
    - Use steam cleaning or soak in a PAA solution (200 ppm) for 20 minutes.
  2. Kegs and Bottles:
    - Clean kegs with caustic and acid solutions as above.
    - Use high-pressure cleaning for bottles, followed by sanitization with PAA.
  3. Filters and Fittings:
    - Disassemble and inspect for microbial buildup.
    - Soak filters in caustic solution, followed by PAA treatment.
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## 5. Environmental Cleaning

1. Floors, Drains, and Walls:
    - Use an alkaline detergent for cleaning.
    - Sanitize with a PAA solution or a quaternary ammonium compound.
  2. Air Systems:
    - Inspect and clean ventilation systems to prevent airborne contamination.
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## 6. Post-Cleaning Validation

1. Swab Testing:
    - Perform microbiological testing (e.g., ATP testing or *Brettanomyces*-specific swabs) on cleaned surfaces.
    - Retest after sanitization to ensure effectiveness.
  2. Water Testing:
    - Test cleaning and brewing water for microbial contamination.
  3. Test Batches:
    - Brew a small test batch and monitor for signs of contamination.
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## 7. Preventive Measures

1. Strict Cleaning Schedule:
    - Implement routine cleaning and sanitization procedures (see our recommended cleaning schedule).
    - Train staff to recognize contamination signs. (See our off flavour training kits)
  2. Separate Equipment:
    - Dedicate hoses, tanks, and pumps for sour or wild beers if applicable.
  3. Environmental Controls:
    - Regularly clean drains and maintain proper humidity levels to discourage Clostridium growth.
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## 8. Products to Consider

- Alkaline Cleaner: PBW (Powdered Brewery Wash) or Caustic Soda.
- Acid Cleaner: Cactus Craft No Rinse Cleaner
- Sanitizer: Peracetic Acid (PAA) or Iodophor.