



THE CIP-KIT

All-in-one to test cleaning in place!

A simplified lab-scale Cleaning In Place (CIP) setup designed to facilitate testing under standardized pressure, time, and temperature.

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INTRODUCTION

Cleaning in Place has been around for approximately 50 years, and is commonly used in hygiene critical industries, such as Food, Beverage and Pharmaceutical, to clean a wide range of plants. CIP refers to the use of a mix of chemicals, heat and water to clean machinery, vessels or pipe work without dismantling plants.

For example, when milk is heated above 60°C, milk stone starts to form. This is a deposit of calcium (and magnesium) phosphates, proteins and fat. You can see the result on heat

exchanger plates after a long production in Figure 1. The whitish deposits sticks tight to the surfaces. To simulate a basic CIP process on lab scale CFT developed a simplified lab-scale Cleaning In Place (CIP) setup.

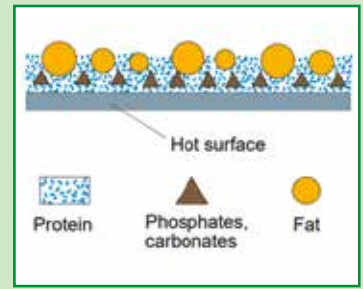


Figure 1.
Deposits on a heated surface

TECHNICAL DETAILS

The CIP-KIT combines the CIP-Box and a mini-dishwasher to create a simplified lab-scale Cleaning In Place (CIP) setup. This equipment is designed to facilitate testing of CIP cleaners under standardized pressure, time and temperature. The CIP-Box can accommodate up to six plates, enabling the assessment of washing effectiveness for each desired rinsing step. With a maximum of three different rinsing steps, it is even possible to evaluate the washing effect in duplicate. The CIP-Box is connected to the mini dishwasher using included tubing. The mini dishwasher allows the addition of your preferred liquid (detergent or chemical solution) It has a capacity of up to 5 liters (see figure 2).



Figure 2. liquid tank in mini dishwasher

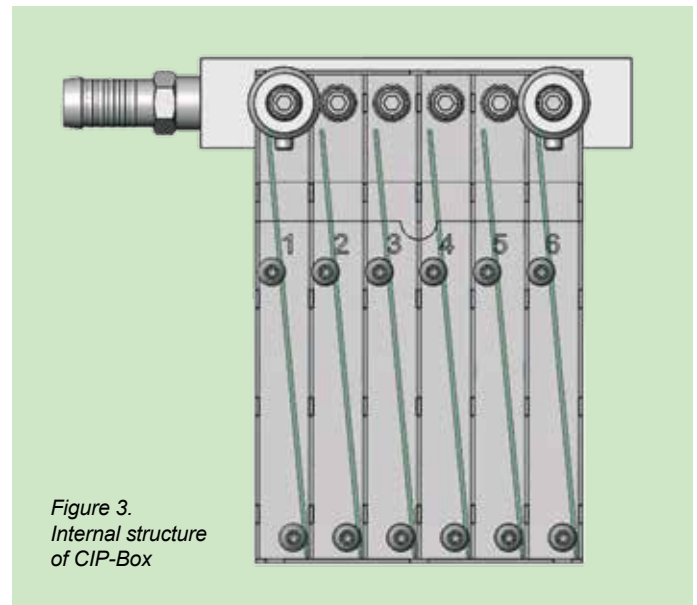


Figure 3.
Internal structure
of CIP-Box

You have the option to connect the dishwasher to a drain or use a bin for the disposal of liquid wash solution. Figure 3 shows a technical drawing of the CIP-Box, which illustrates the internal structure of the box. The six tiles are depicted by a green line, indicating their positions within the box. Water flows through each compartment, ensuring thorough cleaning. The tubing is connected to the nozzle located on the left side of the box. CFT has created two specialized test materials: the DS-41M for simulating milk stone deposits and the DS-41B for simulating beer stone deposits on stainless steel surfaces. These test materials are specifically designed to be used in conjunction with the CIP-kit for effective testing and evaluation purposes.



INSTALLATION INSTRUCTIONS



Step 1.
Remove cap from liquid drain.



Step 2.
Connect drain hose.



Step 3.
Connect the plug to electricity.



Step 4.
Place the end of the drain hose in bucket or sink.



Step 5.
Remove the seal



Step 6.
Remove the reservoir lid



Step 7.
Fill the reservoir



Step 8.
Place the tiles in the CIP-Box.



Step 9.
Start program.

FREQUENTLY ASKED QUESTIONS

Q Is there a video available that shows how the CIP-KIT works?

A No official movie yet, but please scan the QR code to find a short movie



Q What are the dimensions of the mini dishwasher?

A The outer dimensions of the mini dishwasher are: 42cm x 42cm x 42cm

Q What is the working temperature range for the unit? Is it adjustable?

A See the Temperature plot (program P3). The temperature profile is not adjustable when used in combination with the dishwasher. However using the CIP kit w/o the dishwasher you can use whatever temperature you like and set your preferred temperature using a water bath or a simple beaker setup

Q What is the working pressure range for the unit? Is it adjustable?

A The typical pressure is determined by the dishwasher (program P3). The pressure is not adjustable when used in combination with the dishwasher. There is a possibility to change the spray pipes with smaller or bigger holes. However using the CIP kit w/o the dishwasher you can use whatever temperature you like and define your preferred pressure using a water pump or alternative

Q Is it possible to separately purchase the part that you place the tiles into?

A Yes this is possible

Q What is the lead time on the unit if we were to order it?

A Mini Dishwasher: appr. 2-3 weeks; CIP box: appr. 5-6 weeks

Q What are the full electrical requirements for the device?

Technical Data

Electrical connection/Water supply

Connection voltage:..... 220 - 240 V~ / 50 Hz

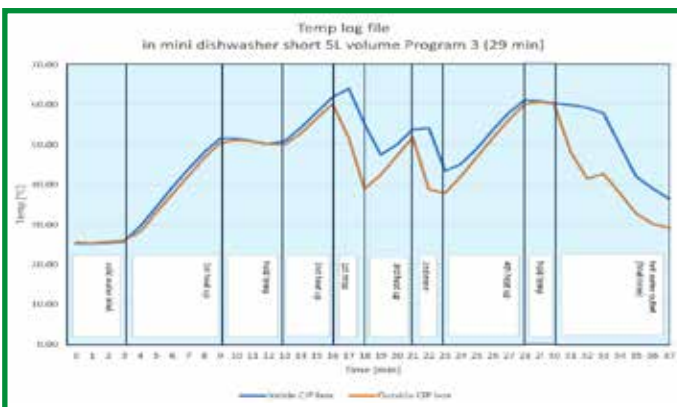
Connection power:..... 730 - 860 W

Water pressure:..... 0.04 - 1 Mpa

$P \text{ (Watts)} = U \text{ (Voltage)} \times I \text{ (Amps)}$

$795W = 230V \times I \text{ (Amps)}$

$I = 795W / 230V = 3.5 \text{ amps min. (3.7 amps max)}$



EXAMPLE TEST METHOD DS-41M OR DS-41B

Equipment:

- CFT CIP Box
- Balance (accuracy 1.001g)
- 10L waste bucket or sink
- Custom mini dishwasher

Testmaterials:

- 6 x DS-41 M (milk stone) or
- 6 x DS-41 B (beer stone)

Cleaning agents:

- Local tap water (8.5°DH) or Demin water
- CFT Alkaline CIP ref cleaner
- CFT Acidic CIP ref cleaner



Test Procedure

- 1 Pre-weight the 6 testmaterials with an accuracy of 0.001g (W_{soiled}).
- 2 Fill the reservoir with 5 liter tap or Demin water.
- 3 Place the 6 testmaterials in the CFT CIP Box
 - Compartment 1 and 2 for water rinse (duplicate).
 - Compartment 3 and 4 for alkaline rinse (duplicate).
 - Compartment 5 and 6 for acidic rinse (duplicate).
- 4 Start program P3 (wash run: 29 min)
- 5 Remove the testmaterials from compartment 1 and 2 (water rinse) after finishing the 1st run.
- 6 Fill the reservoir with 5 liter tap or Demin water and 50 ml CFT Alkaline CIP ref cleaner.
- 7 Repeat step 4.
- 8 Remove the testmaterials from compartment 3 and 4 (alkaline rinse) after finishing the 2nd run.
- 9 Fill the reservoir with 5 liter tap or Demin water.
- 10 Repeat step 4.
- 11 No testmaterials are removed from the compartments after finishing the 3rd run.
- 12 Fill the reservoir with 5 liter tap or Demin water and 50 ml CFT Acidic CIP ref cleaner.
- 13 Repeat step 4.
- 14 Remove the testmaterials from compartment 5 and 6 (acidic rinse) after finishing the 4th run.
- 15 Fill the reservoir with 5 liter tap or Demin water.
- 16 Repeat step 4.
- 17 No testmaterials are removed from the compartments after finishing the 5th run.
- 18 Dry and weigh the 6 washed testmaterials DS-41 M or DS-41 B (W_{washed}).
- 19 Finally clean all the testmaterials to 100% visually (using a sponge, brush or alternative).
- 20 Dry and weigh the 6 tiles which are 100% clean and dry (W_{clean}).
- 21 Calculate % soil removal of each tile:

$$\% \text{ soil removal} = \frac{(W_{\text{soiled}} - W_{\text{washed}})}{(W_{\text{soiled}} - W_{\text{clean}})} \times 100\%$$

Composition CIP ref Cleaners:

CFT Alkaline CIP ref cleaner (pH <1)

- | | |
|---|------------|
| - NaOH 20% | 65-85% |
| - Tetrasodium ethylene diamine tetraacetate 39% | 15-25% |
| - Demin water | up to 100% |

CFT Acidic CIP ref cleaner (pH >13)

- | | |
|-----------------------|------------|
| - Nitric acid 38% | 55-75% |
| - Phosphoric acid 85% | 1-5% |
| - Nonionic | 1-5% |
| - Demin water | up to 100% |