Nozzle Cleaning Best Practice

52707101 Rev. – 04-19 kjk

This document supports Platform Machines
# Nozzle Cleaning Best Practice

## Table of Contents

- **Best Practice for Cleaning Vacuum Nozzles** ............................................................ 1
  - UIC Nozzle Clean 1 Liter, Part Number: 53147101 .................................................... 1
    - Handling Instructions............................................................................................... 1
  - Nozzle Removal Tools ................................................................................................. 1
    - Nozzle Removal Tool Advantages .......................................................................... 2
    - 35-Nozzle Removal Tool, UIC Part # 52342545 .................................................... 2
    - 70-Nozzle Removal Tool, UIC Part # 52578980 .................................................... 2
    - 93-Nozzle Removal Tool, UIC Part # 52449258 .................................................... 3
  - UIC Ultrasonic Cleaner ............................................................................................... 3
    - Features .................................................................................................................... 3
    - UIC Ultrasonic Cleaner Kit ..................................................................................... 4
    - Ultrasonic Cleaner Individual Parts ........................................................................ 4
    - Ultrasonic Cleaner Hanger Tool Kit - UIC Part # 53937401 .................................. 4
  - Nozzle Cleaning Wire Kit – UIC Part # 50841901 ...................................................... 5
  - Recommended Cleaning Process .................................................................................. 6
    - Wash the Nozzles ..................................................................................................... 6
    - Rinse the Nozzles .................................................................................................... 8
    - Dry the Nozzles ........................................................................................................ 8
    - Scheduled Cleaning ................................................................................................. 8
  - Before and After Following Best Practices ................................................................. 9
    - Before Cleaning ....................................................................................................... 9
    - After Cleaning ......................................................................................................... 9
  - **Frequently Asked Questions** .................................................................................. 10
  - **Changes to This Revision** ....................................................................................... 12
Best Practice for Cleaning Vacuum Nozzles

One of the most critical steps to a robust SMT process is having clean nozzles. Contaminated nozzles can lead to mis-picks, skewed placements and even missing components.

Many customers still clean their nozzles with isopropyl alcohol (isopropanol) or other alcohol-based cleaner. Using alcohol on the nozzle will dry out the nozzle tip and destroy the glue holding the part together. This damage can reduce nozzle performance and increase pick and place errors. That will increase operating costs by replacing nozzles sooner than necessary.

Universal recognized the need for a standardized and effective SMT nozzle cleaning application and developed the following best practice. Following these instructions and maintaining a proper cleaning schedule will keep the nozzles performing at an optimal level and maximize their service life.

UIC Nozzle Clean 1 Liter, Part Number: 53147101

UIC Nozzle Clean is:
- Formulated to remove solder paste and other contaminates while preserving nozzle reliability and longevity.
- Approved for use with the entire Universal Instruments nozzle product line.
- Concentrated, to be mixed at a ratio of 9 parts DI water to 1 part UIC Nozzle Clean.
- Available for purchase at http://parts.uic.com/ or via standard PO process.

Other, unapproved cleaners can damage nozzle materials, negatively affecting the reliability or longevity of the nozzles.

Handling Instructions

Use personal protective devices: rubber gloves and safety eye wear when handling UIC Nozzle Clean solution.

- Before using the UIC Nozzle Clean solution, read the included Material Safety Data Sheet (MSDS) in its entirety.
- Follow all instructions within the document; including handling, safety, and storage.
- Always use rubber gloves and safety eye wear for personal protection.

Nozzle Removal Tools

The Universal Instruments nozzle removal tool allows users to remove a complete set of nozzles at one time, keep the nozzles secured during cleaning, and insert the nozzles into their original locations. This significantly reduces the time required to clean the nozzles and ensure that each nozzle is put back in the correct location.
Nozzle Removal Tool Advantages

- Nozzle removal tools are convenient. An entire set of nozzles can be easily removed at one time from the nozzle changer.

- The nozzle removal tool greatly reduces the time it takes to remove and replace the nozzles for cleaning. Using a nozzle removal tool can save several hours for a complete cleaning cycle.

- Eliminates the need to change the nozzle configuration.

- Nozzles remain attached to the nozzle removal tool during the entire cleaning process, including in the ultrasonic cleaner.

- Nozzle removal tools simplify NPI. An entire set of nozzles can be quickly installed in a nozzle changer for NPI runs, and then removed when NPI run is completed, saving additional hours over manual nozzles changes.

35-Nozzle Removal Tool, UIC Part # 52342545

70-Nozzle Removal Tool, UIC Part # 52578980
UIC Ultrasonic Cleaner

Available from Universal Instruments, this ultrasonic cleaner provides superior cleaning ability and capacity to ensure optimum nozzle performance.

Features

- 6.6 liter tank capacity (1.75 gallon)
- Side mounted drain valve
- Easy to use time controller
- Auto shut-off if left on for 12 hours
- Includes one basket
- Additional baskets sold separately
- Sweep Frequency (to ensure no dead spots), enhances cleaning and protects precision nozzles
- Fits objects up to 18 inches in length, including the 93 Nozzle Removal Tool and smaller
- Temperature control: Universal Instruments strongly recommends not using this feature. Excessive heat may cause nozzle damage.
UIC Ultrasonic Cleaner Kit

UIC Ultrasonic Cleaner Kit includes one ultrasonic cleaner machine, one basket, and one power cord. The following cleaner kits are available for different local electrical capacities.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>52792840</td>
<td>110V Ultrasonic Cleaner Kit-5-20R Cord (Cleaner/Basket/Cord)</td>
</tr>
<tr>
<td>52792841</td>
<td>220V Ultrasonic Cleaner Kit-CEE 7/4 Cord (Cleaner/Basket/Cord)</td>
</tr>
<tr>
<td>52792842</td>
<td>220V Ultrasonic Cleaner Kit-BS546 Cord (Cleaner/Basket/Cord)</td>
</tr>
<tr>
<td>52792843</td>
<td>220V Ultrasonic Cleaner Kit-SEV 1011 Cord (Cleaner/Basket/Cord)</td>
</tr>
<tr>
<td>52792844</td>
<td>220V Ultrasonic Cleaner Kit-AS/NZS 3112 Cord (Cleaner/Basket/Cord)</td>
</tr>
</tbody>
</table>

Ultrasound Cleaner Individual Parts

The following individual parts are available for the UIC Ultrasonic Cleaner.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>52792826</td>
<td>110V Ultrasonic Cleaner w/ 5-20R (US) Cord</td>
</tr>
<tr>
<td>52792827</td>
<td>220V Ultrasonic Cleaner (NO CORD)</td>
</tr>
<tr>
<td>52792828</td>
<td>Basket - Ultrasonic Cleaner</td>
</tr>
<tr>
<td>52792845</td>
<td>Power Cord - 5-20R</td>
</tr>
<tr>
<td>52792846</td>
<td>Power Cord - CEE 7/4</td>
</tr>
<tr>
<td>52792847</td>
<td>Power Cord - BS 546</td>
</tr>
<tr>
<td>52792848</td>
<td>Power Cord - SEV 1011</td>
</tr>
<tr>
<td>52792849</td>
<td>Power Cord - AS/NZS 3112</td>
</tr>
</tbody>
</table>

Ultrasound Cleaner Hanger Tool Kit - UIC Part # 53937401

This kit contains 2 hanger tools to use with the ultrasonic cleaner. Use the tools to hang the nozzle removal tool in the ultrasonic cleaner for safe, effective cleaning.
Nozzle Cleaning Wire Kit – UIC Part # 50841901

This kit includes a variety of wire sizes to use for removing obstructions from the nozzle holes. The wires

- Provides 5 different sized cleaning wires:
  - 49167709: 0.004 in. (0.102 mm)
  - 49167701: 0.005 in. (0.127 mm)
  - 46197708: 0.008 in. (0.203 mm)
  - 46197704: 0.014 in. (0.356 mm)
  - 46197706: 0.022 in. (0.559 mm)

- Contains 12 wires of each size
Recommended Cleaning Process

Use rubber gloves and protective eye wear when
- mixing UIC Nozzle Clean solution
- filling and using the Ultrasonic Cleaner
- drying the nozzles with compressed air

Wash the Nozzles

1. Remove UIC nozzles from platform machine with a nozzle removal tool.

2. Put the Nozzle Removal Tools on the Ultrasonic Cleaner Hanger Tools and into the Ultrasonic Cleaner as shown.

3. UIC Nozzle Clean is sold in concentrated form. Before using, make a solution of 1 part UIC Nozzle Clean and 9 parts deionized (DI) water.
4. Add the UIC Nozzle Clean/DI water solution into the Ultrasonic Cleaner so that the fluid level is half way up the Nozzle Removal Tools as shown below.

5. Put the cover on the Ultrasonic Cleaner.

**CAUTION**

To prevent damage to compliant nozzles, Universal Instruments recommends to not use the heating function of the Ultrasonic Cleaner.

Do not leave nozzles in cleaner for extended periods of time. Excessive exposure to the cleaning solution may affect nozzle markings.

To prevent spillage, always put on the cover before operating the Ultrasonic Cleaner.

6. Set the timer to the desired number of minutes. The Ultrasonic Cleaner will stop automatically when the set time ends.

   Estimated cleaning time is 3-15 minutes in Ultrasonic Cleaner. Cleaning time related to the nozzle size and the amount of contamination. In most cases, 3-5 minutes will be sufficient.

**NOTE**

The timer on the Universal ultrasonic cleaner does not move to indicate elapsed time.

7. Remove the nozzles from the cleaning solution as soon as contamination is no longer present.
8. If nozzles are not completely clean, use the matching size cleaning wire to gently loosen and remove contamination.

   Return the nozzles into the solution and run the Ultrasonic Cleaner for another short cycle to complete the cleaning process.

**Rinse the Nozzles**

With the nozzles still attached to the removal tool, rinse with clean, room temperature DI water.

Universal Instruments recommends using a container wide and deep enough to completely submerge the nozzles and removal tool in the DI water.

**Dry the Nozzles**

With the nozzles still attached to the removal tool, dry the nozzles using clean, compressed air.

When the nozzles are completely dry, install the nozzles back into machine.

**Scheduled Cleaning**

- If experiencing repeated pick errors, inspect the affected nozzle and clean if needed.

- Cleaning cycle is related to the specific customer application.

- Nozzle configuration and component mix will determine proper cleaning schedule.

- Monitor the condition of nozzles and clean as required to remove contaminates.
Before and After Following Best Practices

Before Cleaning
This image shows a typical nozzle requiring cleaning due to flux and solder build-up after extended use.

After Cleaning
This image shows the same nozzle after cleaning with UIC Nozzle Clean in the Ultrasonic Cleaner. This nozzle is now ready to use.
Frequently Asked Questions

Q. Is the cleaning process suitable for all Universal Instruments (UIC) nozzles?
A. Yes, the solution and process are both compatible with all UIC nozzles.

Q. Why shouldn’t I use isopropyl alcohol?
A. Isopropyl alcohol (isopropanol) will dry out the tip of compliant nozzles and reduce the nozzles longevity and performance. Isopropyl alcohol will affect the glue holding the nozzle together which also reduces the longevity. Isopropyl alcohol will also negatively affect the nozzle markings, making them illegible or unrecognizable by the platform machine.

Q. Will the cleaning solution used in the UIC cleaning process also affect the tip, glue or the part marking of the nozzle?
A. No, through extensive testing, UIC has formulated a cleaning solution that will not affect the longevity of the nozzle or the part marking, when used properly. However, adherence to the prescribed nozzle cleaning process is required.

Q. Why use deionized (DI) water instead of tap water or distilled water?
A. The impurities in tap water may leave residue on or inside the nozzle and affect performance or reliability. Distilled water has been boiled so that it evaporates and then re-condenses, which leaves most impurities behind. DI water has been purified to remove all of the dissolved mineral salts, which enhances cleaning, and prevent mineral deposits.

Q. What is the cleaning schedule?
A. The cleaning cycle is related on the customer’s applications, including nozzle configurations and part diversity.

Q. Should I follow a regular cleaning schedule?
A. Yes, following a regular cleaning schedule will help keep the nozzles clean and reduce nozzle contamination, to optimize nozzle performance.

Q. Do I need an ultrasonic cleaner?
A. No, however an ultrasonic cleaner will improve the effectiveness of the cleaning solution and greatly reduce the time the nozzle needs to be in the cleaning solution. Excessive soak times may cause nozzle damage over time. Universal Instruments strongly recommends using our ultrasonic cleaner for maximum cleaning effectiveness and reduced exposure to the cleaning solution.

Q. Do I need to use a Universal removal tool?
A. No, a removal tool is not necessary. However, using the removal tool can greatly reduce cleaning cycle time. Our nozzle removal tool also useful when quick changes to the nozzle configuration is required.

Q. Can I clean my non-Universal nozzles with the Universal Cleaning solution?

A. UIC Nozzle Clean may be an effective solution for many OEM nozzles. However, this application has been tested only with the Universal Instruments nozzle product line.

Q. How often do I need to change the cleaning solution in the ultrasonic cleaner?

A. The solution will build up contaminate over time, but customers can expect that it can be used a few times before needing to be replaced. The number of times will depend on the amount of contaminate on the nozzle at the time of cleaning and age/exposure of the cleaning solution.

Q. Can I use my own ultrasonic cleaner?

A. We have fully tested only the ultrasonic cleaner described earlier in this document. Other cleaners may be suitable for use. If equipped with a temperature control, Universal Instruments strongly recommends not using this feature. Excessive heat may cause nozzle damage.
Changes to this Revision

☐ Not applicable; new document release.