

**Illinois State Water Survey
Health and Environmental Applications Laboratory**

**Standard Operating Procedure
For
Cleaning and Preparation of NEON supplies**

SOP Number: PR.NEON.0.cleaning.0.6 (PR 0093)

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Illinois State Water Survey
2204 Griffith Drive
Champaign, IL 61820-7495

Prepared by:  Date: 07/21/2022
Kristina Freeman, Physical Science Technical Assistant

Reviewed by:  Date: 07/21/2022
Nina Gartman, Laboratory Supervisor, HEAL Co-Interim Director

Approved by:  Date: 07/28/2022
Evan Rea, QA Specialist, HEAL Co-Interim Director

Revision History

| Starting revision number | Ending revision number | Revision Date | Revisions Made |
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| 0.0 (draft) | 0.1 | 5/10/2019 | still in draft form, but added note in 12.3.2.5 in response to NEON audit comments |
| 0.1 (draft) | 0.2 | 6/14/2019 | Removed draft watermark, made minor grammatical and formatting revisions, put BK as Approver. Replaced watermark after talking to Nina. |
| 0.2 | 0.3 | 6/24/2019 | Removed draft watermark. Added section 7.3 "Approving Supplies" |
| 0.3 | 0.4 | 3/12/2020 | Updated SOP number to the new convention, changed SOP references to the new convention, changed the sections on thistle tubes and blue lids to reflect updated laboratory procedure. Included extra signature sheet. |
| 0.4 | 0.5 | 8/5/2021 | Removed a note from section 12.3.2.3 |
| 0.5 | 0.6 | 7/18/2022 | Updated procedure for washing blue lids (section 12.3.2); appendix B added |
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1.0 Scope & Applicability

This procedure describes the operation, programming, and maintenance of HEAL labware washers in room 311.

2.0 Summary of Method

Laboratory machine washers are used to prepare sampling supplies for NEON, and for rinsing bottles for use in HEAL. This procedure describes the operation, programming, and maintenance of the HEAL labware washers in room 311 for the purpose of washing supplies from NEON sites. All materials prepared using labware washers are checked for cleanliness

3.0 Definitions

| | |
|-------------|---|
| DI | Deionized (water) |
| HDPE | High-Density Polyethylene |
| HEAL | Health and Environmental Application Laboratory |
| ISWS | Illinois State Water Survey |
| NEON | National Ecological Observatory Network |
| RO | Reverse Osmosis (water) |

4.0 Health & Safety Warnings

EXTREMELY IMPORTANT: Before any repair/maintenance work is done on any HEAL labware washers, power to the machine must be disconnected. Always place one hand on your hip and use the other hand to shut the power down. Do not allow your second hand to contact any surface other than your own body to reduce the risk of electrocution. The disconnect locations are listed below.

In Room 311, Disconnects for the Miele PG8593 under the counter washers are located to the right of the machines, next to the window. Shut off the switches, and unplug the machines before performing repair work.

- 4.1 Always wear eye protection in the laboratory.
- 4.2 No food or drinks are allowed in the sample processing and equipment area to protect the sample integrity.
- 4.3 Safety Data Sheets (SDS) applicable to this SOP can found by searching the University of Illinois SDS page at:
<https://www.drs.illinois.edu/Programs/SafetyDataSheets>
- 4.4 The Illinois State Water Survey Chemical Hygiene Plan covers the ISWS laboratory safety program, including, but not limited to, personal protective equipment used, control equipment inventory and operations (such as vented hoods), employee training programs, medical programs, and safety. The ISWS Chemical Hygiene Plan is available at <https://go.illinois.edu/ISWS-Chemical-Hygiene-Plan>. Procedural notes are included in test methods used (e.g. ASTM International, United States Environmental Protection Agency (USEPA), or Standard Methods for the Examination of Water and Wastewater).

4.5 The University of Illinois Division of Research and Safety requirements for chemical safety can be found at <http://www.dr.s.illinois.edu>.

4.6 The HEAL has listed known health and safety warnings for this SOP, but this list should not be assumed to comprise all health and safety issues.

5.0 Cautions

5.1 Personnel need to be extremely careful when washing laboratory supplies to not contaminate the materials with their hands, clothing, or any other outside contaminant. ANY accidental touching/handling errors will require the supply to be rewashed and the bag (as appropriate) to be discarded. Disposable Polyethylene gloves are worn during the washing process to help prevent handling and contamination.

5.2 When switching out machine accessories (racks, baskets, etc.) be aware of cross-contamination from your hands and the surface the accessory was sitting on. Run the machine through a rinse cycle (at a minimum) before loading the supply to be washed.

5.3 All HEAL labware washers are supplied by the ISWS Laboratory Central RO Water System located in Room 321. Unless otherwise specified in the procedure, NO detergents or chemicals other than RO (or DI) water should be used in HEAL washers at any time. In addition, tap water should never be used in the labware washers.

5.4 Champaign Municipal Distribution water is softened prior to use. It is first filtered through a carbon filter to remove chlorine, passed through reverse osmosis, and finally deionized with two sets of two demineralizing/polishing tanks and a UV source before distribution.

5.5 The ISWS RO system in Room 321 feeds a circulating loop which supplies purified water to Buildings 2 and 3. The resistance of the RO is monitored and recorded daily on the log sheet on the door of Room 321. It must read greater than 12 Mohm-cm before use. Contact the laboratory supervisor if the reading is less than 12 Mohm-cm.

5.6 See the SOP for operating the RO system (SOP# PR.HEAL.0.RO.2.0 [PR-0050]) for more information on the water quality meter and RO system operation.

6.0 Interferences

None

7.0 Personnel Qualifications

Personnel must be trained by a qualified individual. Personnel must submit blanks, have approval from the Laboratory Supervisor, and review the appropriate SOP before they can perform routine cleaning.

8.0 Apparatus and Materials

8.1 Equipment

8.1.1 Room 311: Miele Laboratory Glassware Washer, Model #PG8593, Serial #074390281 and #074390279

8.1.2 Two liter NEON bottles

8.1.3 Thistle tubes

8.1.4 Blue lids

8.1.5 Funnels

8.1.6 Nalgene bottles, 60 mL

8.1.7 Long-handled cotton swabs

8.2 Chemicals & Solutions

8.2.1 Reverse Osmosis (or deionized) water, greater than or equal to 12 Mohm-cm

8.3 Supplies

8.3.1 POLY-D disposable gloves

9.0 Instrument or Method Calibration

None

10.0 Sample Collection

None

11.0 Handling and Preservation

None

12.0 Sample Preparation and Analysis Procedure

12.1 Water Quality Check

12.1.1 The dishwashers are supplied with water by the ISWS laboratory central RO water system located in room 321.

12.1.2 Before washing any supplies, check the water meter in room 321. If the meter in room 321 reads greater than 12.5 Mohm-cm, the water is good.

12.1.3 If the reading is between 10 and 12.5 Mohm-cm, DO NOT wash any supplies until the water has been analyzed for conductance in room 209 and the conductance reading is below 1.00 $\mu\text{S}/\text{cm}$. If the water is less than 10 Mohm-cm, do not use at all. In either case, contact the laboratory supervisor or HEAL director.

12.2 Dishwasher Operation Instructions

12.2.3 Room 311: Programming and usage notes for the Miele Model PG8593 are provided in Appendix A. For additional details on operating this washer, see the manual located in 311, top drawer to the right of the door.

12.3 Washing Procedure

12.3.1 Washing procedure for 2 liter NEON bottles, funnels, thistles, and 60 mL Nalgene bottles

12.3.1.1 Turn the washer on, unlock and open the door, put on POLY-D disposable gloves, and insert the appropriate rack for the equipment to be washed.

12.3.1.2 Run wash cycle #2 to rinse the rack.

12.3.1.3 Gather the appropriate amount of glassware that you will need: 16 two liter bottles, 8 funnels, 16 thistles, or (variable amount) 60 mL bottles.

12.3.1.4 Scan the equipment into the NEON software under 'wash supplies'. Refer to the NEON software operation manual for instructions on operating the NEON software.

12.3.1.5 Once the rinse cycle is complete, unlock and open the washer door. Put on POLY-D disposable gloves, and load the equipment into the washer.

12.3.1.6 Run wash cycle #2.

12.3.1.7 For thistle tubes and funnels: Put on POLY-D gloves, wipe off any visible debris with a cotton swab, then load tubes and/or funnels into the sonicator in room 209, filled with DI water. Run the sonicator for 10 minutes. Then, place the glassware on a red tray and transfer to the wash room. Load into the washer and run wash cycle #2 two times.

12.3.1.8 When the cycle is complete, unlock and open the door, then put on disposable gloves. Gently shake excess water off the rack.

12.3.1.9 Items will need to be either bagged or capped. Items that need to be bagged are: two liter bottles (16 in x 16 in bag), funnels (8 in x 12 in bag), and thistle tubes (4 in x 15 in bag). Do not touch the bottle or the inside of the bag. Slide the bag over the item, then pick up the item from the outside of the bag, then close the bag. 60 mL bottles can be carefully re-capped, not touching the inside of the bottle or cap, and stored in the appropriate box. Label the box with the date and time.

12.3.1.10 Store cleaned, bagged items in clean totes or boxes in room 311.

12.3.2 Washing procedure for blue lids

12.3.2.1 Rinse blue lids with RO water manually three times.

12.3.2.2 Unlock and open the dishwasher, put on POLY-D disposable gloves, place a lid rack in the dishwasher, and run cycle # 2-11 min to rinse the rack.

12.3.2.3 Load lids into the dishwasher, close and lock the door, and run wash cycle # 2-11 min three times

12.3.2.4 Unlock and open the door. While wearing POLY-D gloves, rinse blue lids with polisher DI water three times.

12.3.2.5 While wearing POLY-D gloves, place each lid in a 4 in x 6 in bag. Do not touch the inside of the lid or bag.

12.3.2.6 Place lids on a red tray, repeat until all lids are bagged.

12.4 Prepare QA supplies blanks for all washed supplies as described in Appendix B.

13.0 Troubleshooting

13.1 Refer to the laboratory washer manuals.

14.0 Data Acquisition, Calculations & Data Reduction

None

15.0 Computer Hardware and Software

Neon software

16.0 Data Management and Records Management

16.1 The Daily Activities Log book in room 311 is updated daily and these records are kept for 5 years.

16.2 As new supplies are received, contact the shipping coordinator and record the received supplies in the NEON software (see SOP# PR.NEON.0.tracking [PR-0094], Tracking NEON Supplies, for more details).

17.0 Quality Control and Quality Assurance

17.1 Labware Washers

Required maintenance steps for the labware washers are detailed in Appendix A

17.2 Cleaning Lab

All lab tables and cart surfaces should be cleaned with a sponge using RO/ DI water at least once daily. Unless otherwise specified in the procedure, no chemicals other than RO or DI water should be used. Tap water should never be used for cleaning laboratory surfaces.

17.3 Approving Supplies

17.3.1 A random selection of cleaned supplies blanks must be given to the QA Chemist for testing. The QA Chemist has the responsibility of approving or rejecting supply batches based on the results of the test. Rejected supplies may require additional cleaning steps, which will be prescribed to the technician by the QA Chemist.

18.0 References

HEAL SOP#: PR.HEAL.0.RO.2.0 (PR-0050). Maintenance and Operation of the Reverse Osmosis Water System.

HEAL SOP#: PR.NEON.0.tracking (PR- 0094). Tracking NEON Supplies.

Miele Laboratory Glassware Washer Manual #10 284 390, publication date: 03/01/2016, for Model PG8593.

Appendix A Usage notes guide for Miele PG 8593 washers in room 311.

- D.1 Wash Programs
- D.1.1 These cycles represent modifications of the default factory cycle indicated.
- D.1.2 To access or alter programs, the Access Code is 8000.
- D.1.3 Preset Button #1, Ecowash 44 minutes
- D.1.3.1 General Settings
- Rinse arm monitoring off for basket
 - Drying off
 - Standard water volume
- D.1.3.2 Cycle #1 is used to wash blue caps
- D.1.4 Preset Button #2, Plastics 11 minute
- D.1.4.1 General Settings
- Rinse arm monitoring off for basket
 - Drying off
 - Standard water volume
- D.1.4.2 Wash cycle
1. Pre-rinse 1, unheated, 1 minute
 2. Interim Rinse 3, unheated, 2 minutes
 3. Final Rinse 1, unheated, 1 minute
- D.1.4.3 Cycle #2 is used to wash all NEON plastic bottles (2 liter, 60ML, 250ML) and NEON glassware
- D.1.5 Washer Settings
- D.1.5.1 The settings below are modifications of the machine defaults under “Settings”
- Language: USA English
 - Date: Date format is MM:DD:YY
 - Volume (Keypad tone, buzzer tones, warnings); Loudest
- D.1.6 Additional Settings
- D.1.6.1 The settings below are modifications of the machine defaults under “Additional Settings”
- Code: Cancel program; Code not required
 - Code: Change code; 8000 (default)
 - Move program
 - 1 is Ecowash
 - 2 is Plastics
 - 3 is Organic Materials
 - Dispensing system (DOS_1, DOS_2, DOS_3, DOS_4); All set to inactive
 - Water hardness: 0
 - Switch off after: Yes

D.2 Maintenance

D.2.1 Once a week, the washer screens must be inspected and cleaned.

D.2.2 Remove the bottom screen which is located directly below the lower spray arm.
Rinse thoroughly with DI water.

Appendix B QA Supplies Blanks preparation

- 1) In LIMS, click on **sample prep, NTN filtration, split samples, sample tab.**
- 2) In the drop down menu go to **NEON QA.**
- 3) In the client number box, put load number and what was washed.
- 4) Select three labels to print and click create sample (labels print in room 311).
- 5) One blank is done per load, select the glassware for blanks.
- 6) Place one label on the tray, one label on the glassware and one label on a clean 60 ml bottle.
- 7) Put on POLY-D gloves, rinse 100 ml volumetric cylinder three times with DI water. Fill cylinder to 60 ml.
- 8) For funnel blanks – fill volumetric cylinder with 60 mL of DI, take lid off of the 60 ml bottle, hold funnel over bottle (don't let the funnel touch the bottle), pour the 60 ml of DI water from the cylinder in the funnel, place the lid on the 60 ml bottle and place funnel back in bag (needs to be rewashed).
- 9) For thistle - fill volumetric cylinder with 60 ml of DI, take lid off of 60 ml bottle, open thistle bag hold thistle over 60 ml bottle and pour DI into the thistle. Place thistle back in bag (needs to be rewashed).
- 10) Blue lids - fill with DI water, put back in lid bag. After 24 hours cut corner of lid bag and pour into 60 ml bottle.
- 11) For 2-Liter bottles, fill with 150 mL DI. After 24 hours pour into 60 mL bottle.
- 12) After collecting the samples in the 60 ml bottles, place them on the Blank tray in 301.
- 13) Repeat one blank for every load washed.












PR.NEON.0.cleaning.0.6 (PR-0093)

Final Audit Report

2022-07-29

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