**Purpose:**

This procedure outlines the steps involved in the calibration, cleaning, maintenance and operation of the Helmer Ultra CW cell washer.

**Procedure:**

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| --- | --- | --- |
| **Step** | **Action:** | **Related Documents:** |
| **Quality Control:** |  |
| **1** | * Select a wash program that contains the desired saline volume of 56.4mls.
* Open the lid. On the control panel, press and hold the SALINE button for about four seconds until CALIBRATE 56.4ml appears on the message screen.
* Hold a 100ml graduated cylinder under the nozzle. Press CHECK button.
* Record amount on daily QC form.
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| **Procedure A: Operation:** |  |
| **1** | * Open the lid. Insert and balance up to 12 test tubes in the rotor head.
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| **2** | * Close lid and ensure the Lid Ready lamp is lit.
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| **3** | * Select program desired.
* To start a process that uses the washing group of parameters for the selected program, press the START WASH button.
* To start a process that uses the spinning group of parameters for the selected program, press the SPIN button.
	+ When program ends, an alarm sounds and front panel LED displays “process complete”.
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| **4** | **Performing a programmed wash*** Open lid and insert tubes to be washed in a balanced formation.
* Close lid and pick program to be used by pressing UP or DOWN.
* Press START WASH.
* When the program has finished, the alarm will sound and WASH COMPLETE is shown on control panel. An intermittent alarm will sound if lid is not opened after completion of program.
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| **5** | **Pausing and resuming a wash process*** Pausing a process allows you to access the tubes during a process, and then continue with the process. When you pause a process, the process stops after the current step is completed, at which time you may open the lid. After you close the lid, resume the process where it left off by pressing the START WASH button. If a process is paused, you cannot stop the process until you have resumed it.
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| **Step** | **Action:** | **Related Documents:** |
| **6** | **To pause a wash process*** On the control panel, press the CHECK button. The Check lamp lights. After the current step is completed, the program is paused. OPEN LID appears on the message screen and the Lid Ready lamp lights. At this time, you may open the lid, which clears the Lid Ready lamp. The Check lamp remains lit to indicate the process is paused.
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| **7** | **To resume a paused wash process*** Confirm the following:
1. The rotor is installed
2. The lid is closed
3. The program that is selected is the same one that was selected when the process was started
4. The Lid Ready and Check lamps are lit.
* On the control panel, press the START WASH button. The Check lamp clears and the process resumes.
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| **8** | **Stopping a process**Stopping a process allows you to end the process. When you stop a process, the process stops before the current step is completed. After the rotor has stopped spinning, a completion message is displayed on the message screen. Opening the lid returns the cell washer to display mode for the selected program. |  |
| **9** | **To stop a process*** On the control panel, press and hold the STOP button until the Stop lamp lights. When the rotor stops spinning, OPEN LID appears on the message screen and the Lid Ready lamp lights. If enabled, an audible alert sounds every 30 seconds until you open the lid.
* Open the lid to access the tubes and return the cell washer to display mode for the selected program.
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| **Procedure B: Calibration of Saline Dispensed** |  |
| **1** | * Calibration of Saline Dispensed is done daily as part of Bench QC and documented on the Daily Bench QC form.
* Determine if calibration of saline volume is necessary.
* Compare the total volume displayed to the total volume measured.
* If the measured value is within the tolerance of +/- 5% of the displayed value, then an adjustment is not needed.
* If measured value varies more than 5% from displayed value, you must adjust the volume to calibrate the saline volume.
	+ If an adjustment is needed, determine the difference in volume.
 |  |
| **2** | * + If an adjustment is needed, determine the difference in volume.
	+ (Example: The difference is 38.4 - 41.0 = -2.6 ml)
 |  |
| **3** | * + Determine the adjustment value, rounded to the nearest whole number. (Example 1: -2.6 ÷ 41.0 × 200 = -12.7 rounded to -13)
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| **Step** | **Action:** | **Related Documents:** |
| **4** | * + After you have determined how much to adjust the volume, change the value of the VOLUME ADJUST XX global parameter by the amount that you determined. For example, if VOLUME ADJUST was set to 1, and you determined the adjustment value to be -13, then change VOLUME ADJUST to -12.
* On the control panel, enter programming mode by pressing and holding the parameter selection button for about eight seconds until VOLUME ADJUST XX appears on the message screen.
* Press and release the parameter selection button to cycle through the global parameters.
	+ To save the changes, press the START WASH button. The message screen changes to \*\*\*ok\*\*\* to indicate the program was saved with the new values. The message screen returns to display mode for the selected program.
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| **Procedure C: Cleaning** |  |
| **1** | **Cleaning the exterior**Clean the exterior with soap or mild cleaning agent and water. Dry the exterior with a dry cloth or sponge. |  |
| **2** | **Cleaning the interior*** To prevent blockages and maintain rotor balance, ensure the bowl is clean and free of debris, which may include salt crystals or broken glass.
* To prevent condensation that may lead to corrosion, dry the interior thoroughly after normal daily usage.

**Cleaning the interior continued*** Using a damp cloth or sponge, wipe the bowl, removing all debris. It is not necessary to remove or clean under the bowl.
* Using a dry cloth or sponge, wipe the entire inside of the lid, including the drainage system and painted surfaces.
* To remove the drainage rings:
* Remove the upper drainage ring, which is labeled “this side up,” by pulling it upward until it clears the gasket.
* Remove the lower drainage ring by folding back the gasket to expose the edge of the ring, then gently lifting the ring. Do this in sections at a time until the entire ring is clear of the gasket and can be lifted out of the bowl.
* To install the drainage rings:
* Place the lower drainage ring in the bowl so the drain hole in the ring is directly above the drain in the bowl.
* Working in sections at a time around the bowl, fold back the gasket and press the ring downwards so the edge of the drainage ring rests on the lip of the bowl. The edge of the ring should slightly overlap the lip of the bowl.
* With the labeled side up, place the upper drainage ring into the bowl on top of the lower ring.
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| **Step** | **Action:** | **Related Documents:** |
| **Procedure C: Cleaning - continued.** |
| **3** | **The Clean Program: Flushing the system**To clean and disinfect the cell washer, as well as remove blockages due to salt crystallization, use the Clean Program to flush the system with bleach solution and again with distilled water. The Clean Program consists of two parts: the Clean sequence and the Refill sequence. * + ***Note:*** *These sequences cannot be changed, nor can they be stopped before completion.*

**The Clean sequence consists of the following steps:*** Fill. Dispenses 10 ml of liquid per place on the rotor, regardless of the tube size, while spinning at 1100 r/min. For the 12-place rotor, 120 ml of liquid is dispensed. The fill volume exceeds the capacity of the tube to aid in flushing the drainage system.
* Spin. Spins for 10 seconds at 1500 r/min
* Decant. Spins in the opposite direction at 600 r/min.
* Agitation. Agitates for 5 cycles.
* Decant. Spins in the opposite direction at 600 r/min.

**The Refill Sequence:*** The Refill sequence dispenses 60 ml of liquid, regardless of the rotor type, to purge the system.
	+ ***Note: When you run the Clean Program, the rotor must be loaded with tubes, but every other position on the rotor must be empty.*** *This allows some of the liquid to be dispensed directly into the bowl to aid with cleaning, and flow into the drainage system during the Decant step.*
* You will need the following to complete this procedure:
* A container filled with approximately 500 ml of 10% fresh bleach solution.
* A container filled with approximately 1 liter of distilled water.
* An empty waste container, such as a volumetric measuring device, that has a minimum capacity of 80mls.
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| **4** | **To Flush the System:*** Load the rotor with tubes, leaving every other position on the rotor empty. For example, put tubes in places 1, 3, 5, 7, 9, and 11.
* Install the rotor in the cell washer, close the lid, and ensure the Lid Ready lamp is lit.
* Connect the supply tubing to the container of bleach solution.
* **Flush the system with bleach solution.**
* Select the Clean Program.
* Press the START WASH button. The cleaning sequence starts. When the cleaning sequence is complete, OPEN LID appears on the message screen and the Lid Ready lamp lights.
* Open the lid. The Lid Ready lamp clears and Clean proc. DONE appears on the message screen.
* Connect the supply tubing to the container of distilled water.
* Purge the bleach solution from the system.
	+ Hold the waste container in front of the nozzle.
	+ On the control panel, press and hold the SALINE button for about 3 seconds until the saline lamp lights and REFILL process appears on the message screen. 60 ml of liquid is dispensed from the nozzle into the waste container. When the process is complete, the saline lamp clears and REFILL proc. DONE briefly appears on the message screen, followed by display mode for Program 1
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| **Step** | **Action:** | **Related Documents:** |
| **Procedure C: Cleaning - continued.** |
| **4 cont** | * **Flush the system with distilled water.**
* Repeat steps 1 – 3 with supply tubing in distilled water.
* Connect the supply tubing to the container of saline solution.
* Purge the distilled water from the system. (Repeat steps 5.)

The cell washer is ready for use. |  |
| **5** | **Cleaning the fill ports*** Clean the fill ports on the rotor regularly to remove any debris that was not removed when the system was flushed. Debris can clog the fill ports, preventing saline solution from entering the tubes. If you allow the rotor to dry after washing or suspension processes, debris may accumulate in the fill ports more quickly.
* You will need the following to complete this procedure:
* A container large enough to hold the rotor.
* A source of warm water to soak or flush the rotor.
* The bypass tool.
* Soak the rotor in clean warm water or directly run warm water into the top of the rotor for several minutes and make sure water is flowing freely out of all the fill ports.
* If a port is blocked, gently slide the bypass tool into the fill port from the outside toward the center of the rotor. Gently slide the bypass tool in and out several times to clean the port.
* Do one of the following:
* If the rotor will not be used immediately, ensure that it is dry before returning it to the cell washer and closing the lid.
* If the rotor will be used immediately, ensure that all fresh water has been purged from the system and replaced by saline solution before processing.
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| **Procedure D: Daily/Weekly Monthly Maintenance** |  |
| **1** | These are minimum requirements. * **Daily—Document on Cell Washer Maintenance form**
	+ Check saline volume dispensed.
	+ Inspect the tubing and drain and clear obstructions if necessary.
	+ Inspect the tubing connections and secure them if necessary.
	+ Clean and dry the interior after normal usage to prevent corrosion and contamination.
* **Weekly—Document on Cell Washer Maintenance form**
	+ Flush the system.
	+ Clean the fill ports on the rotor.
	+ Check the saline volume setting and calibrate it if necessary. Frequency varies by length of service.
* **Monthly—Document on Cell Washer Maintenance form**
	+ Inspect the rotor for wear, corrosion, and damage. Replace the rotor if this condition exists or after the rotor has been in use for 5 years.
	+ Inspect the tube holders for wear and damage. Replace tube holders if they are worn or damaged, or after they have been in use for 2 years.
	+ Clean the exterior.
* **Annually—Document on Cell Washer Maintenance form**
	+ Replace the supply and drain tubing.
* **Minimum of Semi-Annually**
	+ Perform tachometer and timer check
 | Cell Washer Maintenance Schedule |

**References**

Helmer Ultra CW Operator’s Manual

Standards for Blood Banks and Transfusion Services, Current Edition. American Association of Blood Banks, Bethesda, MD