



TRAINING UPDATE

Lab Location: SGAH & WAH
Department: Hema

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DESCRIPTION OF PROCEDURE

Name of procedure:
Hematology Slide Stainer Cytocentrifuge, Wescor Aerospray® Model 7151 SGAH.H14, WAH.H14 v001
Description of change(s):
New SOP for Wescor model 7151 and new maintenance log

Document your compliance with this training update by taking the quiz in the MTS system.

Approved draft for training all sites (version 000)

Non-Technical SOP

Title	Hematology Slide Stainer Cytocentrifuge, Wescor Aerospray® Model 7151	
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Laboratory Approval		
Print Name and Title	Signature	Date
<i>Refer to the electronic signature page for approval and approval dates.</i>		
Local Issue Date:		Local Effective Date:

12 month (or new) management review and approval: Signature acknowledges SOP version remains in effect with NO revisions.		
Print Name	Signature	Date

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1. PURPOSE

To describe the operation and maintenance of the Hematology Slide Stainer Cyto centrifuge, Wescor Aerospray® Model 7151.

2. SCOPE

This procedure applies to all staff assigned to Hematology.

3. RESPONSIBILITY

All staff utilizing the slide stainer must comply with this procedure.
Group Leads are responsible for weekly maintenance review.
The technical supervisor is responsible for monthly maintenance review.

4. DEFINITIONS

None

5. REAGENTS

Refer to the Material Safety Data Sheet (MSDS) supplied with the reagents for complete safety hazards. Refer to the section in this procedure covering “SAFETY” for additional information.

Form revised 3/31/00

5.1 Reagent Summary

Reagents	Supplier & Catalog Number
Wescor Buffer pH 6.8	Wescor Cat. # SS-071A
Wescor Hematology Reagent B (Thiazin Stain)	Wescor Cat. # SS-071B
Wescor Hematology Reagent C (Eosin Stain)	Wescor Cat. # SS-071C
Aerospray® Reagent Grade Methanol	Wescor Cat. # SS-MeOH
Aerofix® Additive for Methanol. Dilutes to 500mL.	Wescor Cat. # SS-148
Aerospray® Nozzle Cleaning Solution	Wescor Cat. # SS-029CG

5.2 Reagent Preparation and Storage

NOTES: Date and initial all reagents upon opening. Each container must be labeled with (1) substance name, (2) lot number, (3) date of preparation, (4) expiration date, (5) initials of tech, (6) any special storage instructions; check for visible signs of degradation.

Refer to the Material Safety Data Sheet (MSDS) for a complete description of hazards. If a specific hazard is present, it will be noted in this procedure when the hazard is first encountered in a procedural step.

Reagent	Wescor Buffer pH 6.8 Reagent A (Rinse)
Hazards	Consult MSDS
Contents	Deionized water, KOH, Tritonx-100, Maleic acid and Imidazole
Container	3.8 L plastic bottle
Storage	Room Temperature and away from direct light
Stability	Expiration date on package. Do not use after expiration date.
Preparation	None. Reagent is ready for use.

Reagent	Wescor Hematology Reagent B Thiazin Stain
Hazards	Consult MSDS. Flammable. Store bulk reagents in an explosion proof cabinet.
Contents	Deionized water, Methyl alcohol, Ethanol, TritonX-100, Imidazole Hydrochloride, Azure B and Methylene Blue
Container	500 mL plastic bottle
Storage	Store at Room Temperature away from direct light
Stability	Expiration date on package. Do not use after expiration date.
Preparation	None. Reagent is ready for use.

Reagent	Wescor Hematology Reagent C Eosin Stain
Hazards	Consult MSDS Flammable. Store bulk reagents in an explosion proof cabinet.

Contents	Deionized water, Methyl alcohol, Ethanol, Eosin Y, Triton X-100, Potassium Maleate
Container	500 mL plastic bottle
Storage	Store at Room Temperature and away from direct light. Store bulk reagents in an explosion proof cabinet.
Stability	Expiration date on package. Do not use after expiration date.
Preparation	None. Reagent is ready for use.

Reagent	Aerospray® Reagent Grade Methanol
Hazards	Highly flammable and toxic. Keep tightly closed. Keep away from sources of ignition. No smoking in area of use. Wear suitable clothing and gloves. In case of an accident or if you feel unwell, seek medical advice immediately and show the product label, if possible. Toxic by inhalation, in contact with skin, and if swallowed. Danger of very serious irreversible effects.
Contents	Anhydrous Reagent Grade Methanol.
Container	500 mL plastic bottle
Storage	Store at Room Temperature. Store any inventory not in use on the instrument in an explosion-proof cabinet.
Stability	Expiration date on package. Do not use after expiration date.
Preparation	See below

Reagent	Aerofix® Additive for Methanol
Hazard	Irritating to eyes. Wear suitable protective clothing, gloves, and eye/face protection. In case of contact with eyes, rinse immediately with copious amounts of water and seek medical advice. Harmful if swallowed.
Contents	Ethylene glycol, PVP, and Azure B.
Container	135 mL plastic bottle
Storage	Room temperature away from direct light. . Store bulk reagents in an explosion proof cabinet.
Stability	Expiration date on package. Do not use after expiration date.
Preparation	Used as an additive to Aerospray® Reagent Methanol (SS-MeOH) to eliminate refractile artifacts in erythrocytes. 1. Add 15mL SS-148 to 500mL Methanol SS MeOH 2. Mix well.

Reagent	Aerospray® Nozzle Cleaning Solution
Hazards	IRRITANT: Irritating to eyes and skin. Wear suitable personal protective equipment (PPE) including protective clothing, eye/face protection, and gloves. FLAMMABLE: Once prepared for use, contents are flammable. Keep away from sources of ignition. No smoking in area of use.

	See MSDS for details.
Contents	Deionized water and oxalic acid.
Container	0.5 U.S. gallon plastic bottle
Storage	Store at Room Temperature. After preparation, store in an explosion-proof cabinet.
Stability	Expiration date on package. Do not use after expiration date.
Preparation	<ol style="list-style-type: none"> 1. Add 250mL Methanol or Ethanol to bottle of SS-029C 2. Mix well 3. Check box on label when mixed. <p>Once prepared, reagent is flammable. Store the prepared reagent in an explosion-proof cabinet.</p>

6. QUALITY CONTROL

6.1 Performance Checks

6.1.1. Stain Quality

Examine a smear stained with the Aerospray® slide stainer utilizing a light microscope under an oil immersion lens. Record the stain quality as S (Satisfactory) or U (Unsatisfactory) on the Hematology Differential and Stain Quality Log and the Maintenance Log using the criteria below.

A properly stained smear should have the following characteristics:

1. RBC - Pink with central pallor. Note: Erythrocytes normally exhibit less central pallor using the SS-035 and SS-049 than with traditional stains.
2. NRBC - Dark purple nucleus.
3. WBC
 - a. Neutrophil - Dark purple nuclei with light pink cytoplasm dotted with lilac granules.
 - b. Lymphocyte - Dark purple nucleus. Cytoplasm with varying shades of blue (robin's egg blue).
 - c. Monocyte - Cytoplasm of monocytes stains a faint bluish gray tinge.
 - d. Eosinophil - Bright red to orange granules.
 - e. Basophil - Very large dark bluish purple granules.

For additional information about the special staining characteristics of the Aerospray® slide stainer, refer to Appendix C of the User's Manual.

6.1.2 Differential Comparison

Prepare a blood smear from a specimen analyzed by the automated hematology analyzer. Stain the slide with the Aerospray® Slide Stainer and perform a manual

differential. Compare the results of the manual differential with the automated differential.

Record the results on the Hematology Differential and Stain Quality Log and verify that the manual differential meets the criteria given on the log.

6.2 Control Preparation and Storage

Stain a slide on the Aerospray[®] Slide Stainer. After examination under the microscope for the proper stain quality and differential comparison as outlined above, store in the slide box labeled for the day. Slides are kept for one week.

6.3 Frequency

Stain quality and differential comparison must be performed each day.

6.4 Tolerance Limits

The differential comparison results must be within the established parameters on the Hematology Differential Comparison and Stain Quality Log.

The stain quality must meet the characteristics listed above in Section 6.1.1.

Record the Stain Quality as indicated: **S** =Satisfactory and **U** = Unsatisfactory.

Perform remedial actions for unsatisfactory results using the troubleshooting guidelines in the User's Manual. Document the corrective actions on the reverse side of the Preventive Maintenance Chart.

6.5 Documentation

- Document on the Preventive Maintenance Chart.
- Refer to complete policies and procedures for QC documentation and record retention requirements in the Laboratory QC Program.

7. EQUIPMENT and SUPPLIES

7.1 Assay Platform

Not applicable

7.2 Equipment

- Wescor Aerospray[®] Hematology Slide Stainer/ Cytocentrifuge Model 7151
- Microscope
- Slide Staining Carousel (12-slide capacity) AC-028
- Cytopro[®] Cytocentrifuge Rotor (AC-160) when using Cytocentrifuge function

7.3 Supplies

- Wescor Nozzle Maintenance Kit AC-077
- Sample Chambers with Caps and Fast (White) Cytopad® Absorption Pads
- Sample Chambers with Caps and Slow (Tan) Cytopad® Absorption Pads
- Isoton®
- 22% Bovine Albumin Solution
- Microscope Slides (25 x 75 mm)

8. PROCEDURE

NOTE: For all procedures involving specimens, buttoned lab coats, gloves, and face protection are required minimum personal protective equipment. Report all accidents to your supervisor.

8.1	Instrument Set-up Protocol						
1.	<p>The Wescor Aerospray® Slide Stainer/Cytocentrifuge can be pre-programmed upon installation. SGAH and WAH have customized the settings based on the validation of the stain.</p> <p>Customizing the settings for the stainer: Press PROG from the keypad on the instrument</p> <p style="padding-left: 20px;">There will be four options available</p> <p style="padding-left: 40px;">1 = stain intensity 2 = set fixation 3 = adjust stain 4 = stain mode</p> <ol style="list-style-type: none"> a. First set the stain intensity by choosing 1. You have the option of 1/9 on the keyboard. Choose 4. This is the validated intensity. b. Press STOP, then PROG c. Next set the adjust stain by choosing 3 and then set T/E ratio to 4; Spin time to 7 and Rinse to 5. d. Press STOP, then PROG e. Lastly set the STAIN MODE by pressing 4. Then choose 2 WRIGHT GIEMSA. f. Press STOP <p>When the settings are customized for SGAH and WAH you should see: WRIGHT GIEMSA #4+ displayed on the LED readout on the front of the stainer. These settings along with the pH in use were validated and should not be changed except with permission.</p> <p>The settings are as follows:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Intensity: 4</td> <td style="width: 50%;">T/E Ratio : 4</td> </tr> <tr> <td>Fixation: 4</td> <td>Spin Time : 7</td> </tr> <tr> <td>Mode: Wright Giemsa</td> <td>Rinse: 5</td> </tr> </table> <p>Stain adjust is locked off with a password...please contact your supervisor</p>	Intensity: 4	T/E Ratio : 4	Fixation: 4	Spin Time : 7	Mode: Wright Giemsa	Rinse: 5
Intensity: 4	T/E Ratio : 4						
Fixation: 4	Spin Time : 7						
Mode: Wright Giemsa	Rinse: 5						

8.1	Instrument Set-up Protocol
2.	<p>On installation, the Automated Reagent Level Monitoring System is zeroed and calibrated to warn the user when reagent levels drop to approximately 100mL. The instrument will continue running through these warnings, and it is up to the user to visually monitor the reagent levels, and to replenish the reagent before running out completely.</p> <p>CAUTION: To prevent damage to the pumps, never run a dry pump for more than 10 seconds.</p>
3.	<p>For complete details of all instrument set-ups, consult User's Manual Section 3.8 and Programming Manual.</p>

8.2	Specimen Preparation
1.	<p>Whole Blood: Using a well-mixed sample of whole blood collected in EDTA; prepare blood films according to the standard procedure for wedge pull film technique. Label the slide with patient's name and accession number. Avoid thick smears which can tear during staining. Allow slides to air dry before placing slides in the stainer.</p>
2.	<p>Body Fluids: Samples must be processed using the Cyto centrifuge function as described below (Section 8.4) before placing slides in the stainer.</p>

8.3	Test Run/Slide Stainer Mode
1.	<p>Select the slide staining carousel. To remove the carousel lid, press the button on the lid handle and lift. Never load chipped or cracked slides into the stainer. Load labeled slides into the carousel. The smears must face clockwise with the labeled end of the slide oriented TOWARD the central hub.</p>
2.	<p>If loading fewer than 12 slides, balance the rotor by placing slides in opposing positions on the carousel. Use blank slides to even the loading pattern and prevent over-staining.</p>
3.	<p>a. If staining 8 or fewer slides: Enter the number of slides to be stained on the numbered Keypad. This will save reagent when staining just a few slides. NOTE: The stainer defaults to the full carousel setting after each staining cycle.</p> <p>b. If staining 9 or more slides: The stainer treats 9-12 slides as a full carousel. Therefore, you do NOT need to program the number of slides.</p>
4.	<p>Replace the carousel lid by pressing the release button as you lower the lid over the indexing posts. Release the button and press the lid handle lightly until it clicks into place. Place the carousel on the instrument hub. Close the stainer lid.</p>
5.	<p>Press RUN to begin staining.</p>
6.	<p>The signal tone sounds at the end of the staining cycle. Remove the rotor and unload the specimen slides for screening. NOTE: Never press the carousel lid release button while carrying the carousel. This will allow the carousel to drop, which can cause severe damage.</p>
7.	<p>Examine slides with a microscope. If stain is unacceptable, repeat with new slide after troubleshooting. See the User's Manual troubleshooting Section 6.</p>

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8.4	Special Handling: Cyto centrifuge Operation
1.	The Cyto centrifuge function is used to sediment sample cells onto microscope slides in preparation for staining. Refer to the appropriate CSF, Synovial Fluid, and/or Body Fluid SOP for sample preparation and handling.
2.	Select the Cytopro® Cyto centrifuge Rotor (AC-160) with accompanying supplies. Using pre-cleaned slides, label two slides with the patient's name and accession number. Place each labeled slide into a slide bracket with the labeled side facing the rotor. The release levers need not be depressed to load slides
3.	Select a Cytopad® according to the sample: (Cytopads come in two absorption rates.) a. Low viscosity or low cellularity samples , such as cerebrospinal fluid: Use the slow (tan) pad b. Viscous samples , such as synovial fluid: Use the fast (white) pad.
4.	Using the chamber with selected Cytopad®, depress the release lever and insert a chamber assembly. Release the lever while gently pressing down on the top of the chamber frame to ensure the chamber is squarely seated.
5.	Refer to the specific cell count procedure (CSF, Synovial, or Body Fluid) to determine the volume of sample to place in the chamber. The total volume in chamber (including additives) may not exceed 0.5 mL. The optimum cell recovery is obtained with sample volumes of 0.2 to 0.3 mL.
6.	Load the appropriate amount of sample and prewetting fluid, if needed. Gently apply a chamber cap to minimize contamination and accidents.
7.	Place the lid on the rotor by lifting the locking pin as you place the center pin into the rotor lid receptacle. Press down on the locking pin until it locks.
8.	Carefully transfer the rotor to the Aerospray® stainer, taking care not to bump or tilt the rotor while transferring. Gently lower the rotor into place on the drive hub. If necessary, rotate the rotor until it fits over the drive hub. Be sure the rotor is firmly seated on the hub.
9.	Close the instrument lid.
10.	Press the CYTO/CENT button and the pre-programmed settings for the Cyto centrifuge should display. (1000 RPM and 5 MIN)
11.	Press RUN .
12.	After the tone signaling the end of the cycle, remove the rotor from the Aerospray® and put it on a flat surface.
13.	Remove the rotor lid by pressing with one hand on the center of the rotor lid while lifting the locking pin with the other hand. Check the chambers for complete absorption of suspension fluid. If the fluid is not completely absorbed, rerun the sample.
14.	Completely depress the release lever and remove the chambers. Discard chambers in a biohazard container.
15.	Remove the slide and air dry until completely dry prior to staining. Stain as described in section 8.3.
16.	Check for any other pending tests on the sample. If not needed by another department, store the remainder of the sample as indicated in the specific body fluid SOP.

9. MAINTENANCE

WARNING! Always wear eye and hand protection when performing preventive maintenance on the Aerospray® Slide Stainer/Cytocentrifuge.

9.1	Daily Maintenance: Must Be Performed by All Three Shifts
1.	Run the Carousel Clean followed by a System Clean cycle. The carousel can also be cleaned manually as needed.
2.	Use a squirt bottle filled with SS-230 or methanol to spray the stainer interior. With a clean paper towel, wipe the nozzle faces and interior surfaces. Use a fine bristled brush as necessary to clean the nozzle orifices (see Section 6.2 and 6.3 of User’s Manual for details.)
3.	Spray the exterior case using methanol. Wipe all surfaces clean with a paper towel.
4.	Document actions on the Preventive Maintenance Chart.
5.	Before staining, you have the option to run the Spray Pattern Test to verify nozzle performance (See Sections 6.2 and 6.3 User’s Manual.)
6.	The instrument requires the lines to be filled with methanol prior to staining. Run a System (or Carousel) Clean Cycle to prepare for staining. If you press RUN with any other reagent other than methanol in the lines, a warning display and signal will be given until System Clean is run.

9.2	Weekly Maintenance
1.	Perform the SPRAY PATTERN and SPRAY VOLUME tests as described below in Section 9.3 and 9.4.
2.	Pour 50 mL of SS-230 or methanol into the stainer bowl drain. Wipe down the nozzles, carousel tray and carousel lid using methanol (or SS-230) in a squirt bottle and a clean paper towel.
3.	Flush the instrument drain with 200 to 300 mL of water to prevent buildup of paper fibers, precipitates, etc. (See page 49 of User’s Manual.) Verify the drain is allowing the stainer bowl to empty.
4.	Document actions on Preventive Maintenance Chart.

9.3	SPRAY PATTERN TEST
1.	Remove the carousel from the instrument.
2.	Place a plastic cup over the drive hub to protect the drive motor from liquid during nozzle performance tests.
3.	Hold a sheet of white paper in front of the carousel hub. Press the prime button of the desired reagent to replace the methanol in the line.
4.	Press MAINT , then 1 for Pattern Test, then press the prime button of the reagent line you wish to test to spray a short burst of the corresponding reagent onto a clean sheet of paper.
5.	Run the System Clean after a Volume or Pattern Test to ensure all reagents are ready for use.

9.3	SPRAY PATTERN TEST
6.	The spray pattern must be round and uniform. If the spray pattern is abnormal (see examples on page 65 of User’s Manual), a clogged nozzle may be the reason. You can usually resolve this problem by doing one or both of the following: <ul style="list-style-type: none"> • Press the bristles of the provided nozzle brush into the nozzle orifice. • Run a CLEAN cycle, the repeat step immediately above. • If the above measures do not solve the problem, disassemble and clean the nozzle (refer to Section 6.3 User’s Manual).

9.4	SPRAY VOLUME TEST
1.	Remove the carousel from the instrument.
2.	Place a plastic cup over the drive hub to protect the drive motor from liquid during nozzle performance tests.
3.	Press MAINT .
4.	Press 1 to select Volume Test from the menu.
5.	Hold a 14 mL centrifuge tube from the Aerospray® Maintenance Kit against the desired nozzle.
6.	Press the corresponding Prime button . The pump for that position will run for 20 seconds.
7.	Place the centrifuge tube containing the collected reagent in the correct position (A, B,C, or D) in the tube stand of the maintenance kit that corresponds to the reagent line being tested.
8.	Repeat steps 1 through 4 for each reagent.
9.	Record results of the volume test on the Preventive Maintenance Chart. Examine results for satisfactory performance as outlined in section 9.5.

9.5 Tolerance Limits for Volume test

Nozzle	Expected Volume
A Reagent	9.0 to 11.0 mL
B, C, and D Reagents	9.5 to 12.0 mL.

Low Volume: A reduction in volume from a spray nozzle is typically caused by reagent precipitate for foreign matter inside the nozzle. If the CLEAN cycle does not help, the best solution is to manually disassemble and clean the spray nozzle. See User’s Manual Section 6.2 and 6.3.

If reagent delivery trends lower and cleaning does not rectify the situation, or if the nozzle plugs immediately after cleaning, the stain mixing system may be fouled. Perform the Line Cleaning Procedure (User’s Manual Section 5.1). If this does not remedy the problem, notify your Supervisor and/or call for Service.

Excessive Volume: If you collect excessive volume, make sure the nozzle is assembled correctly (see REASSEMBLY in Section 6.3 of User’s Manual.) If this fails to correct the problem, contact your Supervisor and/or call for Service.

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9.6	Monthly Maintenance
1.	Disassemble and clean all nozzles as described in the User's Manual Section 6.3. Do not mix or interchange nozzles or nozzle parts.
2.	Reinstall the cleaned nozzles. ALWAYS return nozzles to the same location in the stainer.
3.	Perform SPRAY PATTERN and SPRAY VOLUME tests. Record the results of the end of month Spray Volume test on the PM chart. Run the System Clean cycle to prepare for staining. NOTE: As you begin a new month, the "Volume after Monthly Cleaning" becomes the "Previous Month's Ending Volume" and should be transferred to that category on the Preventive Maintenance Chart.
4.	Clean and disinfect reusable rinse bottles with a fresh 1:10 dilution of household bleach. Allow this to stand in the bottles for 10 minutes. Rinse each bottle with tap water, then with deionized water.

10. TROUBLESHOOTING

Using high quality microscope slides with good nozzle maintenance including frequent use of the Clean Cycles will prevent most staining problems with this instrument.

If you suspect a problem with reagent delivery, you should diagnose the problem by assessing the performance of the stain spray nozzle. Assess the fixation nozzle for fixation problems.

Test spray pattern and spray volume as described above to determine if reagent is being delivered properly. If needed, use the cleaning instructions in the User's Manual to clean the nozzle.

Consult the Troubleshooting section of the User's Manual for additional help with operation and/or sub-optimal staining characteristics.

11. SAFETY

The employee has direct responsibility to avoid injury and illness at work. Nearly all harmful exposures to infectious substances and chemicals, and other injuries, can be avoided with effective training and consistent safe work practices.

Become familiar with the Environmental Health and Safety (EHS) Manual to learn the requirements on working safely and protecting the environment from harm. Although lab work typically focuses on the hazards of working with specimens and chemicals, we must also control other important hazards.

- Slips, trips, and falls cause many serious injuries. Please ensure that spills are cleaned quickly (to avoid slippery floors) and that you can see and avoid obstacles in your path.

- Ergonomic injuries result from performing tasks with too much repetition, force, or awkward position. Ergonomic injuries include strains and back injuries. Learn about ergonomic hazards and how to prevent this type of injury.
- Scratches, lacerations, and needlesticks can result in serious health consequences. Attempt to find ways to eliminate your risk when working with sharp materials.

Report all accidents and injuries immediately to your supervisor or the business unit Environmental Health and Safety Manager or Specialist.

12. RELATED DOCUMENTS

- MSDS Material Safety Data Sheets (MSDS)
- Laboratory Safety Manual
- Laboratory Quality Control Program
- Cell Count and Differential, CSF
- Body and Synovial Fluid Analysis
- Hematology Differential Comparison and Stain Quality Log

13. REFERENCES

1. 7151 Aerospray® Hematology Stainer/Cytocentrifuge User’s Manual, Wescor, Inc., 2010.
2. AC-160 Cytopro® Cytocentrifuge Rotor User’s Manual, Wescor, Inc. Logan, Utah, 2004.
3. Cytpro Cytocentrifuge Methods Manual M2365-4 revA, Wescor, Inc. 2003.
4. www.wescor.com

14. REVISION HISTORY

Version	Date	Reason for Revision	Revised By	Approved By

15. ADDENDA AND APPENDICES

Hematology Slide Stainer Preventive Maintenance Chart (see Attachment tab of Infocard)

Hematology Slide Stainer Preventive Maintenance Chart



Washington Adventist Hospital
Shady Grove Adventist Hospital

Month / Year: _____

Daily					Weekly							Monthly					
Clean Cycle and Wiping					Nozzle Performance							Clean Reagent Nozzles and Instrument					
Day	AM	PM	Night	*Daily Control Slides	Week	Reagent	Spray Pattern (✓ if okay)	**Expected Spray Volume	Measured Spray Volume	New Spray Volume (if nozzle was cleaned)	Drain Line Flush (see back page weekly step 4)	Initial	Reagent	Previous Months Ending Volume	Volume After Monthly Cleaning	Disinfect reusable rinse bottle (✓ when cleaned)	Initial
1					1	A		9-11 mL	mL	mL			A				
2				B			9.5-12.0 mL	mL	mL								
3				C			9.5-12.0 mL	mL	mL								
4				D			9.5-12.0 mL	mL	mL								
5					2	A		9-11 mL	mL	mL			B				
6				B			9.5-12.0 mL	mL	mL								
7				C			9.5-12.0 mL	mL	mL								
8				D			9.5-12.0 mL	mL	mL								
9					3	A		9-11 mL	mL	mL			C				
10				B			9.5-12.0 mL	mL	mL								
11				C			9.5-12.0 mL	mL	mL								
12				D			9.5-12.0 mL	mL	mL								
13					4	A		9-11 mL	mL	mL			D				
14				B			9.5-12.0 mL	mL	mL								
15				C			9.5-12.0 mL	mL	mL								
16				D			9.5-12.0 mL	mL	mL								
17					Annually or as needed							Supervisor Approval					
18					Clean B and C lines				Date								
19					Check internal and exterior tubing and fittings				Date								
20					<p>Preventive Maintenance Chart procedures are located on reverse side.</p> <p>Instructions for the Spray Pattern Test, Spray Volume Test, and cleaning the nozzles are contained in the User's Manual.</p> <p>The frequencies set forth on this chart for maintenance are only estimates. Field conditions and usage affect the need for maintenance. Do preventive maintenance at the level necessary to keep nozzle performance within specification and slides staining correctly.</p> <p>Warning: Always wear eye and hand protection when performing preventive maintenance on the Aerospray Slide Stainer.</p> <p>This Preventive Maintenance Chart may be reproduced in its entirety by Aerospray users.</p> <p>* optional **Volume relationships between nozzles are as important as the actual volumes collected. Investigation should center on whether the nozzles are delivering close to the same volumes.</p>												
21																	
22																	
23																	
24																	
25																	
26																	
27																	
28																	
29																	
30																	
31																	

Weekly review:	Weekly review:	Weekly review:
Weekly review:	Weekly review:	Monthly review:

Preventive Maintenance Procedure	Reagent Lot Record					Corrective Action Log
DAILY: At end of each shift or if instrument will be idle for more than four hours:	Day	Reagent A	Reagent B	Reagent C	Reagent D	
1. Run the Carousel Clean followed by a System Clean cycle at the end of each shift or as required to keep the stainer clean. The carousel can also be cleaned manually as needed.	1					
2. Once each day or as needed, use a squirt bottle filled with SS-230 or methanol to spray the stainer interior. With a clean paper towel, wipe the nozzle faces and interior surfaces. Use a fine bristled brush as necessary to clean the nozzle orifices.	2					
3. Spray the exterior case using methanol. Wipe all surfaces clean with a paper towel.	3					
4. Initial completion of daily procedure on preventive maintenance (PM) chart.	4					
5. When you are ready to use the instrument again, you may want to run a SPRAY PATTERN test to verify nozzle performance prior to staining. Should any pattern appear abnormal repeat step 2 to clean nozzle orifice. (Run control slides if desired).	5					
WEEKLY:	6					
1. Perform the Spray Pattern and Spray Volume tests. Record the volume collected from each Reagent on the PM chart.	7					
2. If volume trends lower, or if the spray pattern is abnormal, clean the nozzle orifice with a fine-bristled brush or disassemble and clean the affected nozzle(s).	8					
3. Pour 50 mL of SS-230 into the bowl drain. Wipe down the nozzles, carousel tray and carousel lid using methanol in a squirt bottle (or SS-230) and a paper towel.	9					
4. Slowly pour 200-300 mL of water into instrument drain to prevent build up of paper fibers, precipitates, etc. Verify drain is flowing properly and not allowing fluid to back up in bowl or flow out of air vent on case back.	10					
5. Initial completion of weekly PM.	11					
MONTHLY:	12					
1. Disassemble and clean both nozzles as described in User's Manual. Do not mix or interchange nozzles or nozzle parts.	13					
2. Reinstall nozzles. <i>Always return nozzles to the same location in stainer.</i>	14					
3. Perform SPRAY PATTERN and SPRAY VOLUME tests. Record results of end of month SPRAY VOLUME test on preventive maintenance chart.	15					
<i>NOTE: As you enter a new month the Volume After Monthly Cleaning number becomes Previous Months Ending Volume number.</i>	16					
4. Disinfect reusable rinse (Reagent A) bottle with a 1/10 dilution of household bleach. Allow to stand in bottle for 10 minutes. Rinse thoroughly with deionized water.	17					
5. Initial completion of monthly PM.	18					
6. Supervisor check and initial.	19					
ANNUALLY:	20					
1. Clean the B & C reagent lines with prepared SS-029C, methanol, or ethanol (see manual). This procedure may be used whenever volume test shows declining values with a clean nozzle.	21					
2. Check internal and exterior tubing and fittings for cracks, leaks, or any type of deterioration. Replace as needed.	22					
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	Instructions for Reagent Lot Record					Corrective Action Log Instructions
	Each time you replace a reagent bottle, record lot number from the new bottle in the box that corresponds to the reagent changed and current months numeric date.					The Corrective Action Log is optional. Document each problem occurrence with (1) the date, (2) a brief description of the nature of problem, and (3) any corrective action taken to resolve or correct problem.