

Document Title: Operation of the Midas III Slide Stainer SH.CP.AU.hem.0017.0003		
Author:	Effective Date:	Supersedes Procedure #
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Revised By:	Date Revised	Effective (adopted) Date:
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REVISION HISTORY

Procedure #	Revision Date	Reason for Revision
SH.CP.AU.Hem.0017.0002	11/12/2015	Update format; remove fecal leukocytes, update procedure
SH.CP.AU.hem.0017.0003	3/5/2018	Add bone marrow staining programming for clinical trial study; update format; add knowledge check

TITLE: Operation of the Midas III Slide Stainer

I. PURPOSE

- A. The purpose of this document is to provide use and functions of Midas III stainer used to stains blood smears, fecal leukocyte preps and fluid slides for microscopic analysis

II. SCOPE

- A. To be used by UR Medicine Hematology-Chemistry laboratory staff for hematology slide staining.

III. RESPONSIBILITIES

- A. Department and functional responsibilities are defined in the table below:

Group/Person	Responsibility
Quality Assurance	<ul style="list-style-type: none"> • Supports the development of this document. • Review and approval of this document.
Medical Director	<ul style="list-style-type: none"> • Ensures that the procedure is followed. • Review and approval of this document.
Supervisor	<ul style="list-style-type: none"> • Ensures that the procedure is followed. • Review and approval of this document.
End User	<ul style="list-style-type: none"> • Follows the procedure.

IV. SPECIMENS

- A. Peripheral blood slides
- B. Body fluid slides (CSF, synovial, pleural, peritoneal, etc.)
- C. Bone marrow slides

V. QUALITY CONTROL

Stain quality will be checked and recorded daily (see SH.CP.AU.frm.0220).

VI. SPECIAL SAFETY PRECAUTIONS

- A. Rinse water is disposed of into a dirty sink. Any methanol based products (the methanol in staining vessel 1 and the Wrights stain in staining vessels 2 and 3) will be poured into an empty gallon jug for disposal by Environmental Health. The contents for staining vessel 4 can be rinsed down a dirty sink.
- B. All patient specimens should be considered potentially infectious and must be handled with precautions used for human blood, as described in CDC

(Center for Disease Control) recommendations and in compliance with the Federal OSHA (Occupational Safety and Health Administration) Blood-borne Pathogen Standard, 29 CFR (Code of Federal Regulations) part 1910.1030. Follow specimen handling as outlined by Laboratory Safety Policy, (SH.CP.AU.gen.0005).

- C. Electric shock hazard is always a danger, especially considering the proximity of the water bath. Always disconnect the line cord when servicing equipment.

VII. MATERIALS

- A. Equipment
 - 1. Midas III Slide Stainer
- B. Supplies
 - 1. Slide carrier
 - 2. Stains/Fixative vessels
 - 3. Drying vessel
 - 4. Vessel covers
 - 5. Slides
 - 6. Graduated cylinders
- C. Reagents
 - 1. Giemsa stain
 - 2. Wright's Stain
 - 3. Phosphate Buffer pH 6.8
 - 4. Deionized water
 - 5. Methanol

VIII. REAGENT PREPARATION

- A. **Staining Vessel 3**
 - 1. Wright's stain plus buffer
 - a. Measure 50 ml of Wright's stain into a graduated cylinder then pour into the staining vessel.
 - b. Fill the remaining volume of the staining vessel with 6.8 pH Phosphate buffer.
- B. **Staining Vessel 4**
 - 2. Giemsa stain plus deionized water
 - a. Measure 20 ml of Giemsa stain into a graduated cylinder then pour into the staining vessel.

- b. Fill the remaining volume of the staining vessel with deionized water.

IX. CONTROL AND INDICATORS

KEY	FUNCTION
PROGRAM	Enter processing steps for a program
REVIEW	View each successive programmed processing step Push ENTER to view each processing step Push PROGRAM to write over incorrect steps Push ENTER to the end of the program
RUN	Starts execution of a program
STOP	Pauses the stainer and raises the tower (Press RUN to continue or 1X, 2X, 3X, Program will stop and the arm will go to the Home Position)
ENTER	Enters selected processing steps into system memory
CLEAR	Push PROGRAM button and Program No., then ENTER Press CLEAR to start programming the new sequence To clear an incorrect entry, use "0" or write over the entry
UP and DOWN arrow	Used to navigate through menus
Number pad	Used to select program numbers and processing steps

DISPLAY	FUNCTION
PROGRAM NUMBER	Indicates program currently being run or reviewed
STATION NUMBER	Indicates station currently being run or reviewed
STATION TIME REMAINING	Indicates time remaining in program at station being used (STA is displayed on keyboard) Also time in station in review
DIPPING STATION/AGITATION	Displays DIP for dipping, no dipping (---) (By temp area)
STEP NUMBER	Indicates step currently being run or reviewed
TEMP C degrees	Indicates temperature currently being run or reviewed (Displayed to the right in review area)
TOTAL TIME REMAINING	Indicates total time remaining in the program

X. PROCEDURE**A. Entering a Program**

1. Turn power on by using the ON/OFF switch on back of unit by the power cord and wait for the unit to initialize.
2. Press PROG to enter the programming mode.
3. The stainer has 9 available programs numbered 1 through 9. Select a program number and press that number on the keypad.
4. Selected program number is displayed. Press ENTER
5. If the Midas III stainer already has a protocol stored under the selected program number, it will display.
6. If the program number that is already stored needs to be deleted, press Clear for New Program, then press Clear again to start the new programming sequence. Otherwise, select a different program number.
7. Enter the station number corresponding to the vessel location desired. Stations 1 through 6 are available. Press that number on the keypad. Press ENTER.
 - a. In the far left home position the tower arm is at Station 6.
 - b. Station 1 is the far right station.
 - c. Rinse vessel is stationary at station 5 and the
 - d. Drying station is stationary at station 6.
8. Enter the required time for the selected station in minutes and seconds. Press ENTER.
9. Using the up and down arrows select agitation if desired.
10. If station 5 is selected, the Midas III stainer will ask for the flow rate selection after programming the agitation mode. Use the up and down arrows and select 1500. Press ENTER.
11. Press ENTER.
The first station is now programmed and the display is cleared for the next station.
12. Repeat steps 4 through 7 for each step in the staining sequence. The programmed sequence can contain up to 29 steps, in any order.
13. After the final step is programmed and the unit is displaying a blank step, press STOP to save the program.

B. Reviewing a program

1. Press REVIEW
2. Press the number of the program to be reviewed. The program number is displayed.
3. Press ENTER
4. The first step in the program sequence is displayed, which is the program number. Continue to press ENTER to look at all steps in programming sequence. These steps include; station number, DIP if agitation is selected or “---” if agitation is deselected, station time in minutes and seconds, the flow-rate of station 5 and the temperature in degrees C if station 6 is selected.
5. Once all steps in the current sequence are displayed, the Midas III will display:
END OF PROGRAM
(program number being reviewed)
6. Press the STOP key at any time to exit the Review mode.
7. Press PROG key any time when the information about a step is displayed and you want to change the selection for that step (i.e. station number, time, agitation or flow rate) to enter the program EDIT mode.

C. Changing an existing program

1. Press REVIEW
2. Press the number of the program to be changed.
3. Press ENTER to view the first step of the program. Continue to press ENTER until the desired step is located.
4. Press PROG. The Midas III will display the station number for the selected step. Change the station number by pressing the desired station number and ENTER. If you do not want to change the station number just press ENTER.
5. Enter new time by pressing 0000 and then new time using number keys followed by ENTER.
6. Change agitation if desired by pressing the up or down arrow keys, followed by ENTER. Press ENTER if no change is needed.
7. If station 5 is being edited, to change the flow rate press the up or down arrows to the desired rate. Press ENTER if no change is needed.
8. If no other changes are necessary press STOP. Press ENTER to view the remainder of the program. Press REVIEW to continue with the review mode. If changes to any other step(s) or if additional steps are desired continue the EDIT process.

D. Staining Procedure

1. Turn on the Midas III Slide stainer with the ON/OFF toggle on the back of the instrument. Wait for the instrument to initialize.
2. Perform Maintenance:
See SH.CP.AU.jad.0111, Midas Stainer Maintenance diagram for initial set up of staining vessels.
 - a. Daily – Wipe off the cabinet and bench area with damp cloth to prevent build-up of residue and subsequent corrosion.
 - 1) Night shift – replace Methanol, and top off Wright's stain
 - 2) Day shift – replace ALL staining vessels
 - 3) Evening shift – replace Methanol, and top off Wright's stain
 - b. Cover stain vessels when not in use to minimize evaporation.
 - c. Weekly – Clean the cabinet with mild detergent solution. To remove stain residue from the stainless top panel, use methanol.
 - d. Record all maintenance on the daily log.
3. The black vessel with the opening on the side is for Station 6. Make sure the opening is on the left toward the fan. The dryer at Station 6 takes about 2 minutes to reach 45°C.
4. Replace methanol/stain per shift assignment. Remove the covers from the staining vessels.
5. Load slides into carrier.
 - a. Lay carrier on its side. Slide up the metal retaining plate on the slide carrier.
 - b. Load the slides into the carrier with the smear end away from the retaining plate. The slides may face left or right.
 - c. Slide down the retaining plate to hold the slides in the carrier.
6. Running a program
 - a. Load the staining vessels into the appropriate station for the program being run.
 - b. Mount the slide carrier onto the two rods of the tower arm. Gently and firmly slide the carrier back until the magnetic catch engages.
Note: Do not move arm left or right or up or down.
 - c. Press RUN, then the number of the desired program and ENTER. The run will start, the arm will initialize, and the tower will move to the first station in the sequence. As the slide carrier runs in each station, the unit will display run information.

- d. To pause or interrupt a run in progress, press STOP. Press RUN to continue the run where it left off.
- e. To cancel the run, press STOP. Wait for tower to go to vertical home position and then press STOP 3 additional times in succession to reset the system or anytime the arm is up. The tower will return to Home position. A scrolling marquee will indicate the stainer is at the Home position on standby.
- f. An audible beep sounds six times at the completion of the program and Standby mode is entered

XI. STAINING PROTOCOLS

A. **White Blood Cell Differentials and Fluids (Program 1):**

Program 1 is programmed with the following parameters:

Station 1: Methanol
Time: 20 seconds
Agitation: no

Station 2: Wright's stain
Time: 3 minutes 30 seconds
Agitation: yes

Station 3: Wright's stain and 6.8 pH buffer
Time: 5 minutes 30 seconds
Agitation: yes

Station 4: Giemsa stain and deionized water
Time: 4 minutes
Agitation: yes

Station 5: Water rinse
Time: 1 minute
Pressure: 1500 mL
Agitation: yes

Station 6: Drying @ 45°C
Time: 2 minutes
Agitation: no

B. **Bone marrows (Program 5):**

Program 5 is programmed with the following parameters:

Station 1: Methanol
Time: 1 minute
Agitation: no

Station 2: Wright's stain
 Time: 7 minutes
 Agitation: yes

Station 3: Wright's stain and 6.8 pH buffer
 Time: 10 minutes
 Agitation: yes

Station 4: Giemsa stain and deionized water
 Time: 7 minutes
 Agitation: yes

Station 5: Water rinse
 Time: 1 minute
 Pressure: 1500 mL
 Agitation: yes

Station 6: Drying @ 45°C
 Time: 2 minutes
 Agitation: no

XII. TROUBLESHOOTING AND SERVICE MODE

- A. Self test program – to run the self test program press RUN 0, ENTER
 The sequence for PROGRAM 0 is:

STATION	TIME
5	10 sec
4	10 sec
3	10 sec
2	10 sec
1	10 sec
2	10 sec
3	10 sec
4	10 sec
5	10 sec
6	3 min

The display will indicate the number of cycles completed.

B. Service mode programs

1. The Midas III software provides 11 service modes to test the performance of various functions as well as to set working parameters.
2. To select the service mode, press SVC key. The software displays the name of the first service mode.
3. The operator can scroll through the entire list of the service modes by pressing the up or down keys.
4. To select a specific service mode press the ENTER key.
5. Once the mode is selected, the user can activate the service mode function or scroll through the available options for the selected parameter value.
6. To select the desired value of a parameter, press the ENTER key to select the displayed options.
7. The STOP key terminates the selected service mode and returns to Standby mode. Prior to exiting the service mode, the mechanism may reinitialize to the home position.

For more details on the service mode functions, refer to Midas III Operators manual, Service Mode Description for the Midas® III-Plus Automated Stainer guide.

For technical assistance and service call toll-free 1-800-222-0342 Monday through Friday 8:30 am to 5:00 pm EST.

XIII. LIMITATIONS

The dryer at Station 6 needs about 2 minutes to warm up to 45°C.

XIV. CALCULATIONS N/A

XV. INTERPRETATION N/A

XVI. RESULT REPORTING N/A

XVII. TRAINING

Personnel	Training Required
Management	Read
End User	Read Perform Skills Assessment

XVIII. REFERENCES

- A. Midas III Slide Stainer Operators Manual
- B. Midas Stainer Maintenance Log (SH.CP.AU.jad.0111)
- C. Midas III Slide Stainer Problem Log (SH.CP.AU.jad.0113)
- D. Clinical Diagnosis and Management, Henry
- E. <http://www.facilities.rochester.edu/cu/hazmat1.htmv>