#### Operating the SP-50 Slide Maker Stainer

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| Background | This procedure describes how to operate the SP-50 Slide Maker Stainer |

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| Supplies and Equipment | * Sysmex ColorWright Wright Stain
* Sysmex ColorWright Phosphate Buffer, pH 6.8
* Methanol, anhydrous
* CELLPACK DCL
* CELLCLEAN AUTO
* Alcohol prep pads, isopropyl
* Microscope slides, frosted with rounded/clipped corners
* Grey storage magazines
* Printer Ribbon
* De-ionized water
* Gauze
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| Start Up |

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| Step | Action |
| 1 | Make sure the main power switch to the analyzer is in the ON position. The main power switch of the main unit can be kept ON at all times.  |
| 2 | Verify there are a minimum of 2 magazines in the supply table  |
| 3 | Verify there are enough glass slides for the daily volume  |
| 4 | Make sure that there are no racks in the sampler lanes |
| 5 | Press the green Power button located on the front of the unit.* Auto logon is enabled
* Once the power on the instrument turns ON, a self-check automatically runs. The self-check consists of: initialization of the mechanical units, rinsing the hydraulic unit, and replenishment of reagent.
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| Sample Requirements |

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| Sample mode | Sample tube | Cap | Position | Required volume | Aspirated volume |
| Auto sampler Prep | Normal sample tube | With cap | Sample rack | 500 uL | 70 uL |
| Manual prep | Normal sample tube | With cap | Normal tube holder | 500 uL | 70 uL |
|  | Normal sample tube | Without cap | Normal tube holder | 250 uL | 38 uL |
|  | Raised bottom tube (RBT) | With or without cap | Normal tube holder | 250 uL | 70 uL |
|  | Microtainer | Without cap | Micro tube holder | 110 uL | 38 uL |

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| Slide Prep Modes |

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| Slide Prep Mode | Description |
| Smearing and staining mode | Use this mode when you want to print sample information on the glass slide and perform sample smear preparation and staining |
| Smearing mode | Use this mode when you want to print sample information on the glass slide and only prepare the smear, without staining |
| Staining mode | Use this mode when you want to stain a smear that was prepared manually, or a sample from which only Smearing mode was performed |
| Print mode | Use this mode when you only want to print sample information on the glass slide. No smear will be performed. |

Note: The magazines are ejected to the magazine storage unit after a pre-set amount of time or after the magazine is filled with stained smears. Magazines can be ejected on-demand by pressing the Eject button on the front of the unit. |

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Operating the SP-50 Slide Maker Stainer, Continued

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| Running on Auto sampler mode |

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| Step | Action |
| 1 | Ensure SP-50 analyzer is in Ready status and indicator light is green |
| 2 | * If specimen is run on the XN analyzer(s) in the Sampler Rack (i.e. Auto/Closed) Mode and a smear is required, the specimen rack will be transported to the SP-50 via conveyor unit and samples will be aspirated by SP-50 automatically
* When complete, system will transport the rack back to the Stop Yard
 |
| 3 | * If specimen is not run on the XN analyzer and does not trigger reflex order for a smear then load sample into rack and place in SP-50 right rack pool
* Rack will start automatically to make smear
* When complete, system will transport the rack back to the Stop Yard
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| Running on manual mode-Smear and Stain |

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| Step | Action |
| 1 | Use for the following purposes* to interrupt sampler preparation for an urgent sample
* to prepare and stain a smear using a regular sample tube, micro collection sample tube or Raised Bottom Tube
 |
| 2 | Press the Mode Switch button on the front of the main unit. |
| 3 | Change the slide preparation mode, touch Select mode |
| 4 | Touch Smearing and staining |
| 5 | Touch OK |

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| Running on manual mode-Smear and Stain, cont. |

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| Step | Action |
| 6 | Touch Manual and verify the smear preparation settings. Then touch OK* Normal sample tube
* Place check mark next to Read Barcode
* Remove check mark next to Cap Open
* Microtainer sample tube
* Remove check mark next to Read barcode and enter CID
* Place check mark next to Cap Open
* Raised bottom tube
* Select RBT
 |
| 7 | Mix the sample |
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|  | **If** | **Then** |  |
| Microtainer or cap open option is selected | * Remove cap then proceed to step 8
 |
| Normal tube or RBT and cap open option is not selected | * Do not remove cap then proceed to step 8
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| 8 | Set the sample tube in the sample tube holder* Regular sample tubes and RBT samples are placed in the front tube holder.
* Micro collection tubes are placed in the rear tube holder
 |
| 9 | Press the Start button on the front of the main unit |
| 10 | Following aspiration, the sample tube holder will eject and the sample tube can be removed |
| 11 | To process additional manual samples, return to Step 6 |
| 12 | To return to sampler mode processing, press the Mode Switch button on the front of the main unit |
| 13 | When preparations of all smears is completed, retrieve the magazine that contains the smears in the slide storage location |

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| Running on manual mode-Stain only |

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| Step | Action |
| 1 | Use for the following purpose* to stain an already prepared smear
 |
| 2 | Press the Mode Switch button on the front of the main unit |
| 3 | Change the slide preparation mode, touch Select mode |
| 4 | Touch Staining |
| 5 | Touch OK |
| 6 | Open the manual magazine holder cover |
| 7 | Pull out the manual magazine holder |
| 8 | Load smeared glass slides into an empty magazine, with the frosted side facing the front |
| 9 | Load the magazine that holds the glass slide into the manual magazine holder cover |
| 10 | Push in the manual magazine holder, then close the manual magazine holder cover |
| 11 | Ensure the status display LED of manual magazine holder is green |
| 12 | Press the Start button on the front of the main unit |
| 13 | For additional smears, follow steps 6-12, using the other manual magazine holder |
| 14 | To return to sampler mode processing, press the Mode Switch button on the front of the main unit |
| 15 | When preparations of all smears is completed, retrieve the magazine that contains the smears in the slide storage location |

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| Running on manual mode-Smear only |

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| Step | Action |
| 1 | Use for the following purpose* to prepare a smear using normal sample tube, microtainer or RBT
 |
| 2 | Press the Mode Switch button on the front of the main unit |
| 3 | Change the slide preparation mode, touch Select mode |
| 4 | Touch Smearing |
| 5 | Touch OK |
| 6 | Open the manual magazine holder cover |

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| Running on manual mode-Smear only, cont. |

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| Step | Action |
| 7 | Pull out the manual magazine holder and load an empty magazine |
| 8 | Push in the manual magazine holder, then close the manual magazine holder cover |
| 9 | Ensure the status display LED of manual magazine holder is green |
| 10 | Touch Manual and verify the smear preparation settings |
| 11 | Touch OK |
| 12 | Press the Start button on the front of the main unit |
| 13 | For additional smears, follow steps 6-13, using the other manual magazine holder |
| 14 | To return to sampler mode processing, press the Mode Switch button on the front of the main unit |
| 15 | When preparations of all smears is completed, retrieve the magazine that contains the smears in the slide storage location |

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| Running on manual mode-Print only | * This mode will not routinely be used. Refer to Instructions for Use if needed
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| Reagent Replacement(No error message) |

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| Step | Action |
| 1 | Touch Maintenance in the menu screen. The Maintenance screen appears |
| 2 | Touch Replacement. The Replacement dialog box appears |
| 3 | Touch Reagent Replacement |
| 4 | If replacing the CELLPACK DCL, use the barcode scanner to input the reagent information of the new reagent. Otherwise, proceed to Step 4. |
| 5 | Remove the cap from the new reagent container |
| 6 | Remove the cap from the old reagent container |
| 7 | Pull out the spout set straight up |

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| Reagent Replacement, cont(No error message) |

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| Step | Action |
| 8 | Insert the spout set straight into the new reagent container and close the cap |
| 9 | Touch Execute to begin priming |

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| Reagent Replacement(with error message) |

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| Step | Action |
| 1 | Press the red error message |
| 2 | Touch Execute in the error message dialog box |
| 3 | Touch the reagent to be replaced |
| 4 | If replacing the CELLPACK DCL, use the barcode scanner to input the reagent information of the new reagent. Otherwise, proceed to Step 4. |
| 5 | Remove the cap from the new reagent container |
| 6 | Remove the cap from the old reagent container |
| 7 | Pull out the spout set straight up |
| 8 | Insert the spout set straight into the new reagent container and close the cap |
| 9 | Touch Execute to begin priming |

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| Reagent Replenishment-Rinse Water |

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| Step | Action |
| 1 | Remove the float switch from the rinse water container. Place float switch on clean paper towels |
| 2 | Fill the container half-way with DI water |
| 3 | Re-insert the float switch back into the container and tighten cap |
| 4 | Touch Maintenance in the menu screen. The Maintenance screen appears |
| 5 | Touch Rinse devices |
| 6 | Touch Reagent Replenishment |
| 7 | Select the Rinse water |

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| Reagent Replenishment, cont-Rinse Water |

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| Step | Action |
| 8 | Touch Execute. Rinse water replenishment starts. When replenishment is completed, the information in the Reagent Replacement dialog box will be updated |
| 9 | Touch Cancel. The dialog box closes |

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| Daily Maintenance-Shutdown | Daily shutdown 1 and 2 will be performed on alternate days

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| Step | Action |
| 1 | Ensure the analyzer is in the Ready state |
| 2 | From the Menu screen, touch Shutdown |
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|  | **If** | **Then** |  |
| Odd number day ( i.e. 1,3,5, etc) | * Select Shutdown 1
* Do not select Close
* Proceed to step 3
 |
| Even number day ( i.e. 2,4,6,, etc) | * Select Shutdown 2
* Do not select Close
* Proceed to step 3
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| 3 | Place the tube of CELLCLEAN AUTO into the regular sample tube holder |
| 4 | Press the Start switch on the front of the main unit |
| 5 | * Shutdown is automatically performed
* Shutdown takes approximately 30 minutes
* The sample tube holder will be ejected forward once the CELLCLEAN AUTO aspiration finishes
 |
| 6 | * Remove the CELLCLEAN AUTO when manual tube holder is ejected
* When all operations are finished, the sample tube holder automatically retracts into the main unit, and the instrument power turns OFF
 |
| 7 | Remove the glass slide used for cleaning. The cleaned glass slide will be loaded into the magazine in the manual magazine holder |
| 8 | Document maintenance task on SP-50 maintenance log |

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| Daily maintenance-Load glass slides |

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| Step | Action |
| 1 | Open the slide set unit cover. Lift the cover up until it locks into place |
| 2 | The status display LED on the slide set unit will be red when the slide cassette is empty. |
| 3 | Remove the slide supply cassette from the slide set unit. |
| 4 | Remove the slide supply cassette guide |
| 5 | Load the new glass slides with the frosted side facing upwards and toward back of cassette |
| 6 | Install the slide supply cassette guide |
| 7 | Install the slide supply cassette |
| 8 | Close the slide set unit cover |
| 9 | Document maintenance task on SP-50 maintenance log |

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| Daily maintenance-Daily QC slide review |

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| Step | Action |
| 1 | Review the blood smears macroscopically for acceptability* Smears are sufficient length
* The feathered edge becomes gradually thinner without streaks, holes, or tails
* Even, consistent staining of blood smear
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Operating the SP-50 Slide Maker Stainer, Continued

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| Daily maintenance, cont-Daily QC slide review |

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| Step | Action |
| 2 | Review the blood smears microscopically for acceptability:* Relatively even distribution of cellular elements
* Acceptable morphology within the working area
* None or very little artifact of the cell morphology (e.g. "punched-out" RBCs, smashed WBCs)
* None, or very little stain precipitate or debris.

The staining is consistent and imparts the characteristic cytoplasmic color differences and distinct nuclear chromatic patterns of the whole spectrum of blood cells. Acceptable stains will display the following characteristics* RBC's should be pink to orange. There should be good differentiation between normochromic, hypochromic, and polychromatic cells
* Lymphocytes will display dark purple nuclei with varying shades of blue cytoplasm
* Neutrophils will display dark purple nuclei, with light pink cytoplasm and lilac granules
* Monocytes will show lighter purple nuclei. The cytoplasm of the monoctyes will be gray-blue with reddish granules
* Eosinophiles show bright orange granules in the cytoplasm
* Basophils display dark blue granules in the cytoplasm
* Platelets will be violet to purple
 |
| 3 | Document maintenance task on SP-50 maintenance log |

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| Weekly Maintenance-Clean Stain pool |

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| Step | Action |
| 1 | Follow the steps to perform Shutdown 1 or 2 |
| 2 | Open the staining part cover |
| 3 | Remove all magazines from the feed-in area |
| 4 | Open the staining pool cover. Place paper towels over the magazine feed-in area to prevent staining the instrument |
| 5 | Lift and remove the two staining pools |

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| Weekly Maintenance, cont-Clean Stain pool |

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| Step | Action |
| 6 | Place the staining pools in the transport containers and transport to a non-handwashing sink for cleaning |
| 7 | Clean the staining pools with methanol. Do NOT let the stain pools maintain contact with methanol for more than 5 minutes |
| 8 | Wipe off the methanol with gauze or paper towels and dispose accordingly |
| 9 | Let the staining pools air dry |
| 10 | Re-insert the staining pools, then remove paper towels and close the staining part cover |
| 11 | Load magazines to the feed-in area |
| 12 | Follow the steps to start-up the analyzer |
| 13  | Document maintenance task on SP-50 maintenance log |

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| Weekly Maintenance-Clean Spreader Glass |

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| Step | Action |
| 2 | Ensure the analyzer is in the Ready state |
| 3 | Touch Maintenance in the menu screen. The Maintenance screen appears |
| 4 | Touch Rinse devices. The Rinse devices dialog box appears |
| 5 | Touch Spreader glass rinsing |
| 6 | Make sure that the smear part cover is closed. |
| 7 | Open the slide set unit cover. Lift the cover up until it locks into place |
| 8 | Confirm that the LED status display on the slide set unit is green. |
| 9 | Remove the slide supply cassette from the slide set unit. Take out both the left and right slide supply cassettes |
| 10 | Close the slide set unit cover |
| 11 | Open the smear part cover. Lift the cover up until it locks into place |
| 12 | Rotate the fan forward and down |

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| Weekly Maintenance, cont-Clean Spreader Glass |

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| Step | Action |
| 13 | * Wipe the spreader glass with an isopropanol alcohol wipe, then dry with a lint free tissue
* Inspect the spreader glass edge for cracks or chips
* If present, perform Spreader Glass Replacing procedure
 |
| 14 | Replace the fan in its original position |
| 15 | Close the smear part cover |
| 16 | Touch **Cancel**. Note: If OK is selected, the spreader glass counter will be reset to zero. Do not select OK |
| 17 | Open the slide set unit cover |
| 18 | Install the slide supply cassette, then close the slide set unit cover |
| 19 | Touch OK |
| 20 | Document maintenance task on SP-50 maintenance log |

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| Weekly maintenance- Clean Rinse water container |

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| Step | Action |
| 1 | Rotate rinse water containers and clean between use to avoid bacterial contamination |
| 2 | Fill a new rinse water container half-way full with DI water |
| 3 | Remove the float switch from the on-board container and insert straight into the new container, then tighten the cap |
| 4 | An alarm will sound, press the red error message. Touch Execute in the Help dialog box. Select the Rinse Water reagent and then select Execute |
| 5 | If needed, dispose of DI water left over in the removed container |
| 6 | Dispose of the used methanol accordingly from the container. Let the newly cleaned container air dry |
| 7 | Document maintenance task on SP-50 maintenance log |

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| Weekly Maintenance- Clean slide magazine |

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| Step | Action |
| 1 | Moisten gauze with methanol |
| 2 | Wipe the top and inside of the magazines to remove any stain |
| 3 | Let the magazines air dry |
| 4 | Document maintenance task on SP-50 maintenance log |

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| As needed maintenance- Replace ink ribbon |

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| Step | Action |
| 1 | Ensure the analyzer is in the Ready state |
| 2 | Open the slide set unit cover. Lift the cover up until it locks into place |
| 3 | Confirm that the LED status display on the slide set unit is green |
| 4 | Remove the slide supply cassette from the slide set unit. Take out both the left and right slide supply cassettes |
| 5 | Close the slide set unit cover |
| 6 | Open the smear part cover. Lift the cover up until it locks into place |
| 7 | Rotate the fan forward and down |
| 8 | Remove the ribbon cartridge. The error message "Ink ribbon not loaded" will display |
| 9 | Touch Confirm in the Help dialog box to continue |
| 10 | Grasp the knob, slide the bracket to the left, and move the ribbon cartridge to the removal position |
| 11 | Lift the ribbon cartridge and remove the hook pin from the bracket |
| 12 | Remove the ribbon cartridge. Lift both rollers of the ink ribbon and remove the used ribbon |
| 13 | Observe the ribbon holder and printer head for debris. Wipe with methanol if necessary |
| 14 | Insert the new ink ribbon down into the ribbon cartridge. Make sure the ink side of the ink ribbon faces downward. Place the blue shaft on the side with the seal, and the white shaft on the opposite side |
| 15 | Mount the ink ribbon into the ribbon cartridge |
| 16 | Remove the slack in the ribbon by turning the white roller |

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| As needed maintenance, cont.-Replace ink ribbon |

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| Step | Action |
| 17 | Install the ribbon cartridge. Catch the ribbon cartridge hook pin on the bracket, then slide the bracket to the right and mount the ribbon cartridge |
| 18 | Replace the fan in its original position |
| 19 | Close the smear part cover |
| 20 | Open the slide set unit cover and install the slide supply cassettes, then close the slide set unit cover |
| 21 | Touch Execute. The ribbon will wind and the error will clear |
| 22 | Document maintenance task on SP-50 maintenance log |

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| As needed maintenance- Replace spreader glass |

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| Step | Action |
| 1 | Replace the spreader glass after 9,000 smears or if damaged |
| 2 | Ensure the analyzer is in the Ready state |
| 3 | Touch Maintenance in the menu screen. The Maintenance screen appears |
| 4 | Touch Replacement. The Replacement dialog box appears |
| 5 | Touch Replace spreader glass |
| 6 | Open the slide set unit cover. Lift the cover up until it locks into place |
| 7 | Confirm that the LED status display on the slide set unit is green |
| 8 | Remove the slide supply cassette from the slide set unit. Take out both the left and right slide supply cassettes |
| 9 | Close the slide set unit cover |
| 10 | Open the smear part cover. Lift the cover up until it locks into place |
| 11 | Rotate the fan forward and down |
| 12 | Remove the spreader glass from the holder |
| 13 | Set the new spreader glass in the holder. Set the glass slide so that the edge with the smallest bevel faces forward (large bevel side to be inserted). Insert the spreader glass all the way into the spreader glass holder until it stops. |
| 14 | Replace the fan in its original position |
| 15 | Close the smear part cover |

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Operating the SP-50 Slide Maker Stainer, Continued

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| As needed maintenance, cont.-Replace spreader glass |

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| Step | Action |
| 16 | Touch OK. The spreader glass operation count resets and the smear unit returns to its home position |
| 17 | Open the slide set unit cover |
| 18 | Install the slide supply cassette, then close the slide set unit cover |
| 19 | Touch OK |
| 20 | Document maintenance task on SP-50 maintenance log |

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| Troubleshooting Stain problems |

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| --- | --- |
| Problem | Resolution |
| * WBCs too light in color
* RBCs and/or PLTs too light in color
* RBCs are too red in color or too blue
 | * Verify that stain times have not changed.
* Replace external stain container. Perform Replace Stain.
* Perform Shutdown 2.
* Check pH of buffer. Replace buffer if pH has changed.
* Check pH of DI water. Replace if necessary.
* Make and stain a test smear
 |
| * Stain Precipitate
 | * Replace external stain container. Perform Replace Stain.
* Check sip tube on stain container and make sure it is 1 inch from the bottom of the container.
* Clean the staining part
 |
| * Water Artifact
 | * Perform Stain Replenishment
* Clean the staining part.
* Make and stain a test smear
* If water artifact is still observed: Replace external stain container, perform Stain Replacement, add methanol prefix to stain conditions. Make and stain a test smear
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Operating the SP-50 Slide Maker Stainer, Continued

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| Additional Troubleshooting | * Refer to the SP-50 troubleshooting manual or contact Sysmex technical support
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| Related Documents | * Form A: SP-50 Maintenance log
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| References | * Sysmex SP-50 Basic Operation, Sept 2017
* Sysmex Sp-50 General Information, Sept 2017
* Sysmex SP-50 Troubleshooting, Sept 2017
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 *End*