AEROSPRAY[®] HEMATOLOGY STAT

MODEL 7122



Applications Manual

SLIDE STAINER/CYTOCENTRIFUGE



AEROSPRAY® HEMATOLOGY STAT

SLIDE STAINER/CYTOCENTRIFUGE

Model 7122

Applications Manual

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Section 1

Introduction

1.1 Instrument Overview	. 7
Using this Manual	. 7
Functional Description	. 8
Key Features	. 9
Intended Use	. 9
Table 1: General Specifications	. 10
Table 2: Performance Specifications	. 11
Table 3: Run Time Sequence	. 12
Table 4: Approximate Reagent Consumption	. 12
Table 5: Carousel and Rotor Information	. 13
Table 6: Explanation of Symbols	. 14
1.2 Instrument Description	. 16
Figure 1: Front and Right Side Panels	. 16
Figure 2: Front Panel and Touchscreen	. 17
Figure 3: Rear Panel	. 17
Figure 4: Stainer Bowl Components	. 18
Figure 5: Nozzle Diagram	. 18
Table 7: Preventive Maintenance Kit	. 19
Barcode Reader	. 20
Figure 6: Barcode Reader	. 20
1.3 Touchscreen and User Interface	. 21
Table 8: Front Panel/Main Screen Function Keys	. 21
Table 9: System Setup Keys	. 22
Table 10: Maintenance Function Keys	. 24

Section 2

Setup and Preparation for Operation

2.1 Instrument Setup	25
Unpacking and Installing the Stainer	25
Connecting the Drain Tube and Waste Container	26
Connecting Power	26
Installing Reagent Bottles	27
Installing the Barcode Reader	28
2.2 Preparing the Stainer for Operation	29
Priming Procedures	29
The Clean Cycle	31
Performing Tests	31
Reagent Level Monitoring	32
Enabling/Disabling Reagent Level Detect	32
Zeroing the Reagent Level Sensors	33

Section 3

Controlling and Customizing Stainer Functions

3.1 System Setup Menu	35
Accessing the System Setup Menu	35
Stain Programs	35
Creating a Stain Program	36
Editing, Renaming, or Adjusting Stain Programs	36
Administrator and User Accounts	37
Creating an Administrator Account	37

Section 3

Controlling and Customizing Stainer Functions (continued)

Creating User Accounts	
Managing User Access	
User Login/Logout	
Using Reagent Information Tracking 41	
Modifying Level Detect Functions 41	
Changing User Language 42	
Setting the Date and Time	
System Log 42	
Accessing Logs 42	
Exporting Logs	
Controlling Beeper Alerts 43	
QC/Maintenance Tracking	
Enable Stain Slide Tracking	
Enable Cyto Slide Tracking	
Enable Manual Entry 45	
Enable Preventive Maintenance Tracking	
Enable Reagent Tracking 45	
Restoring Software Defaults 46	
3.2 Recording Specimen and Reagent Information 47	
Scanning Slides with the Barcode Reader	
Scanning Reagent Bottles with the Barcode Reader	
Manually Entering Specimen information	
Manually Entering Reagent Information	
3.3 The Help Menu 51	
Using Help51	

Section 4

Operating the Stainer

4.	1 Operating Instructions	52
	Suggested Staining Protocol	52
	Performing a Hub Pattern Test	52
	Figure 7: Correct Hub Pattern Test Result	52
	Figure 8: Incorrect Hub Pattern Test Result	52
	Loading the Carousel	53
	Figure 9: Loading the Carousel	54
	Figure 10: Specimen Placement on Slide	54
	Using Blocking Slides	55
	Figure 11: Using Blocking Slides	55
	Performing a Stain Cycle	55
	Unloading the Carousel	56
	Monitoring Reagent and Waste Levels	57
	Table 11: Reagent Level Detect Display Symbols	57
	Replacing a Reagent Bottle	58
	Emptying the Waste Container	58
ction 5		

Section 5

Preventive Maintenance and Safety

5.1 Preventive Maintenance	59
Daily Maintenance/Quality Control (QC)	59
Weekly Maintenance5	59
Monthly Maintenance6	50
Using the Preventive Maintenance Log	50

Section 5

Preventive Maintenance and Safety (continued)

Section 6

Nozzle Maintenance and Performance

6.1 Nozzle Disassembly and Cleaning	. 68
Nozzle Disassembly	. 68
Nozzle Cleaning	. 68
6.2 Nozzle Reassembly	. 69
6.3 Manual Priming	. 70
6.4 Performing the Volume Test	. 71
Table 12: Volume Test Tolerances	. 71
6.5 Performing the Slide Pattern Test	. 73
Figure 13: Correct Slide Pattern Test Result	. 73
Figure 14: Incorrect Slide Pattern Test Result	. 73

Section 7

Solving Problems

7.1 Troubleshooting	74
Table 13: General Troubleshooting and Diagnosis	.74
7.2 Abnormal Staining Results	80
Smear Separation or Tearing	80
Improper Alcohol Fixation	80
Wet Smears	80
Thick Smears	80
Dirty Slides	80
Red Cell Artifacts	80
Use Aerofix [®]	81
False-Positive Howell-Jolley Bodies or Amorphous	
Precipitates	81
7.3 Instrument Malfunction	83
Air or Reagent Leaks	83
Reagent Level Detect System Errors	84
Calibrating the Reagent Level Detect System	84
7.4 Calibrating the Touchscreen	86
7.5 Service Information	87

Section 8	
Cytopro [®] Cytocentrifuge	
8.1 Cytopro Cytocentrifuge Information	88
Functional Description	88
Key Features	88
Cytopro [®] Rotor	88
Appendix A: Critical Reagent Components	89
Appendix B: Risk and Safety Phrases	

1.1 Instrument Overview

Using this Manual

This manual provides instructions to install, operate, and maintain the Aerospray Hematology Stat Stainer/Cytocentrifuge. The manual is an important part of the product. Read it carefully and completely before setup and first use of the instrument.

If additional accident prevention and environmental protection requirements exist in the country of operation, this manual must be supplemented by appropriate instructions to ensure compliance.

Safety Regulations

This instrument has been built and tested in accordance with safety regulations for the following device types: electrical control, regulating, and laboratory. In order to maintain this condition and ensure safe operation, the operator must observe all the instructions and warnings contained in this manual. For current information about applicable standards, please refer to the CE Declaration of Conformity included with the documents shipped with this device.

NOTE: This equipment complies with the emission and immunity requirements described in the IEC 61326 series.

Understanding Warnings

This manual uses three warning levels to alert you to important information as shown in the following examples.

WARNING!

A Warning alerts to the possibility of personal injury, death, or other serious adverse reactions stemming from the use or misuse of this device or its components.

CAUTION:

A Caution alerts to possible problems with the device associated with its use or misuse. Such problems include device malfunction, failure, damage, damage to the sample, or damage to other property. Where applicable, a Caution may include precautions to be taken to avoid the hazard.

NOTE: A Note reinforces or supplies additional information about a topic.

Specific Warnings

Pay particular attention to the following safety precautions. If these safety precautions are ignored, injury or damage to the instrument may occur. Each individual precaution is important.

WARNING!

Install the stainer in a well-ventilated area. If ventilation is inadequate, operate the instrument under a safety hood.

1.1 Instrument Overview

WARNING!

Reagents used in the stainer contain moderately hazardous chemicals that require care in handling. Always use appropriate safety measures including gloves and eye protection when handling reagents.

WARNING!

Always wear protective clothing and eye protection when using Nozzle Cleaning Solution (diluted REF: SS-029C). Dispose of used solution properly.

WARNING!

If power is lost while the stainer is running, the lid will remain locked until power is restored. Do not attempt to open the lid while power is off.

WARNING!

Electrical shock hazard: Do not open this instrument or attempt internal repairs. Refer servicing to qualified service personnel. Contact ELITechGroup Biomedical Systems service.

CAUTION:

This equipment has been designed and tested to CISPR 11 Class A and FCC Part 15 Class A. In a domestic environment it may cause radio interference, in which case, you may need to take measures to mitigate the interference.

CAUTION:

To avoid serious instrument damage, always use reagents supplied by ELITechGroup. Except for approved methanol, using reagents not supplied by ELITechGroup may void the warranty.

CAUTION:

Only spare parts supplied or specified by ELITechGroup should be used in this device. Using non-approved parts may affect the performance and safety features of the instrument. If the equipment is used in a manner not specified by ELITechGroup the protection provided by the equipment may be impaired. If in doubt, contact your ELITechGroup representative.

Functional Description

The Aerospray Hematology Stat Slide Stainer/Cytocentrifuge (Model 7122) is a dualpurpose, microprocessor-controlled slide staining and cell preparation system. In use, atomizing spray nozzles apply fresh reagents onto microscope slides prepared with blood or other body fluid specimens. The slides are mounted in a rotating carousel for processing.

1.1 Instrument Overview

Key Features

- Minimized reagent consumption
- Rapid staining
- Barcode scanner for tracking specimens and reagents
- Reagent and specimen traceability
- User traceability
- Administrator password
- Interactive touchscreen display
- Multiple languages
- High-volume staining productivity (12 slides per stain cycle)
- Separate reservoir, delivery tube, pump, and spray nozzle for each reagent
- Operator-selectable automatic alcohol fixation function to fix specimens
- Reagent and waste level monitoring
- Log files
- 10 Stain Intensity Settings

The correct accessory must be used for each function. The Cytopro Cytocentrifuge Rotor is available as an option offering additional features (see Section 8).

Intended Use

The Aerospray Hematology Stat Slide Stainer/Cytocentrifuge (Model 7122) is intended for use by medical professionals to stain specimens that may include blood and other body fluids, as a step of standard laboratory practice in diagnosing disease. Addition of the Cytopro rotor allows preparation of slides by cytocentrifugation before staining.

1.1 Instrument Overview

Table 1: General Specifications

Category	Characteristics
Slide Carousel Capacity	1 to 12
Carousel Rotation Speed	Reagent application: 20 rpm (\pm 5%)
	Slide Drying: 950 rpm (± 5%)
Cytocentrifuge Rotor Speed	100 to 2000 rpm (\pm 5%), user programmable
Reagent Consumption	Refer to Approximate Reagent Consumption, Table 4
Operating Time	Refer to Run Time Sequence, Table 3
Display	7 in. WVGA (800 x 480 pixels) TFT
Touchscreen Controls	Menu-driven icons
Drain Connection	Connector on rear panel accepts male connector attached to vinyl drain tube. 1.8 meters (6 ft.) length supplied
Ventilation	Air is exhausted from the stainer via a female ½ inch SAE pipe thread fitting
Dimensions Width Height (lid closed) Depth Height (lid open)	57 cm (22 in.) 25 cm (10 in.) 54 cm (21 in.) 58 cm (23 in.)
Weight	15.2 kg (33.5 lb.)
Electrical Requirements	100 to 240 VAC (± 10%) @ 50 to 60 Hz
Power Consumption	200 Watts maximum
Fuses	2.0 Amp time-lag (Type T) (5 x 20 mm) (2 required) Manufactured by Littlefuse (Part No. 218002) or Bussman (Part No. GDC-2A)
Ambient Temperature	
Operating	15 to 30 °C (59 to 86 °F)
Storage	-10 to 50 °C (14 to 122 °F)
Relative Humidity	≤ 80% non-condensing
Altitude	≤ 2000 m (≤ 6562 ft.)

1.1 Instrument Overview

Table 1: General Specifications (continued)

Category	Characteristics
Pollution Degree	2
Heat Dissipation Maximum Average During Staining Average While Idle	512 Btu/hour max 34 Btu/hour 10 Btu/hour
Maximum Sound Emission	72 dB

Table 2: Performance Specifications

Category	Characteristics
Reagent Spray Nozzles	Four reagent nozzles: A, B, C, D
Reagents:	A - Rinse
NOTE: Use only ELITechGroup reagents, with diluents as specified for ELITechGroup concentrated reagents.	B — Thiazin Stain (Blue)
REF numbers for this stainer start with one of the following: SS-035, SS-049, SS-135, SS-149, SS-048, or	C – Eosin Stain (Red)
SS-148.	D – Methanol or Aerofix®
	<i>Note:</i> Methanol must be 99.5% pure no more than 0.5% water.
Stain Settings	Number of slides to stain. Intensity settings: 1-10. Fixation level: Off, Normal, High

1.1 Instrument Overview

Table 3: Run Time Sequence

NOTE: Table 3 represents a typical timing sequence for this instrument using the 12-slide carousel, presented for general reference only. Timing is in seconds. Actual cycle times may vary.

Staining Mode	Medium Dark Setting (5)
Fixation Pump D (Optional)	(102)
Eosin Stain (Pump C)	21
Thiazin Stain (Pump B)	33
Rinse (Pump A)	27
High Speed Dry	33
Total without fixation (in minutes)	1.9
Total with fixation (in minutes)	3.6

Table 4: Approximate Reagent Consumption (mL)

Staining Mode	Medium Dark Setting (5)	Clean Cycle
Reagent A: Rinse	6.0	7.5
Reagent B: Thiazin	6.0	7.5
Reagent C: Eosin	6.0	7.5
Reagent D: Fixative	1.4	38.0

1.1 Instrument Overview

Table 5: Carousel and Rotor Information

Only the following slide staining carousel or cytocentrifuge rotor can be used in this instrument. Each should be used following the instructions in this manual or the Cytopro Applications Manual (RP-517).

Rotor/Carousel	Maximum	Maximum Capacity	Maximum
	rpm		Sample
			Volume
12-Slide Carousel (AC-188)	1000 rpm	12 each, 26 mm x 76 mm (1 x 3 inch) microscope slides	N/A
Cytopro Cytocentrifuge Rotor (AC-160)	2000 rpm	8 each, standard chambers, plus slides	Up to 600 μL*
		8 each, Cytopro Magnum chambers, plus slides	Up to 6 mL*

*Do not overfill cytocentrifuge chambers. See Cytopro Applications Manual or Methods Manual for detailed instructions and warnings.

1.1 Instrument Overview

Table 6: Explanation of Symbols

\sim	Alternating Current (AC)
EC REP	Authorized Representative in the European Community
LOT	Batch Code
Ŕ	Biological Hazards (Biological Risks)
REF	Catalog Number (Model Number)
\triangle	Caution, Consult Accompanying Documents (Attention, see instructions for use)
CE	CE Mark, product meets the essential requirements designated in Annex I of the In Vitro Device Directive (IVDD) 98/79/EC
Ĩ	Consult Instructions For Use
\otimes	Do Not Reuse
	Do not use if package is damaged
	Fragile, Handle with Care
	Fuse
ED -	General Symbol for Recovery, Recyclable
IVD	In vitro Diagnostic Device (In vitro Diagnostic Medical Device)
*	Keep away from sunlight (Keep away from heat)
	Manufacturer
X	Waste Electrical and Electronic Equipment
	Reagent stable after opening for number of months specified

1.1 Instrument Overview

Table 6: Explanation of Symbols (continued)

I	"On" (Power)
0	"Off" (Power)
5 0	Environment Friendly Use Period
SN	Serial Number
1	Temperature Limitation – indicates high and low limits. (Normal room temperatures are specified for all ELITechGroup Reagents.)
R	Use By
	Volume Control
٨	General Warning, Caution, Risk of Danger
	Warning, Biological Hazard
	Corrosive
<u>¥</u> 🅸	Environment Hazard
	Flammable
	Harmful/Irritant
8	Oxidant
	Тохіс
	Product to be used for manual cleaning only. Do not pump product through instrument.

1.2 Instrument Description

Figure 1: Front and Right Side Panels



- C Eosin
- D Methanol or Aerofix
- 6 Reagent Tray

1.2 Instrument Description

Figure 2: Front Panel and Touchscreen



- 1 Standby/Ready Button
- 2 Touchscreen

The front panel features an interactive touchscreen display. Refer to Front Panel/Main Screen Function Keys (Section 1.3, Table 8) for more information.



- 1 USB Ports
- 2 Network Ethernet Connection
- 3 Exhaust Vent
- 4 Rear Panel Label
- 5 Biohazard Warning Label
- 6 Waste Tube Connection
- 7 Level Detection Connection for Waste Container
- 8 Power Switch
- 9 Fuse Door
- 10 Power Cord Connection
- 11 Model/Serial Number Label

1.2 Instrument Description

Figure 4: Stainer Bowl Components



- 1 Nozzle D (Methanol or Aerofix)
- 2 Nozzle C (Eosin stain)
- 3 Nozzle B (Thiazin stain)
- 4 Nozzle A (Rinse)
- 5 Drive Hub

Figure 5: Nozzle Diagram



- 1 Compression Screw
- 2 Swirl Cone
- 3 O-Ring
- 4 Nozzle Housing

1.2 Instrument Description

Component	Name	Description
	Manual Priming Tool	Primes air-locked pumps.
Can 3 I Can	Silicon Grease	Lubricates the nozzle threads for easy assembly.
	Nozzle Wire	Cleans nozzle housing orifices.
	Nozzle Cleaning Strainer	Strains the nozzle parts to prevent them from going down a drain.
	Nozzle Tool	Unscrews nozzles from the stainer bowl.
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Nozzle Wrench	Disassembles the nozzle.
	Nozzle Brush	Cleans nozzles without removing them from the stainer.

## Table 7: Preventive Maintenance Kit

## **1.2 Instrument Description**

## Table 7: Preventive Maintenance Kit (continued)

Component	Name	Description
<b>WINN</b>	Volume Test Collection Tubes (small tube)	Collects reagents while performing the Volume Test.
	Nozzle Maintenance Tube Stand	Holds Nozzle Cleaning Tubes (large tube) and Volume Test Tubes (small tube).
	Nozzle Cleaning Tubes (large tube)	For soaking nozzles in the Nozzle Cleaning Solution.

## **Barcode Reader**

An optional barcode reader is available for the Hematology Stat Stainer/Cytocentrifuge (Model 7122).

## Figure 6: Barcode Reader



# 1.3 Touchscreen and User Interface

Users control all instrument functions from the interactive touchscreen display.

Table 8: Front Panel/Main Screen Function Keys

Button	Name	Description
	Standby/Ready	With instrument power ON:
		Blue = Ready
		Amber = Standby
		Pressing Standby runs a System Clean cycle and
		places instrument into standby mode.
		The Standby/Ready button also accesses the
		System Setun Menu (Section 3.1)
		System Setup Mena (Section 5.1).
	Maintenance	Accesses features for verifying proper nozzle
		performance and places pumps in a testing
		sequence. Accesses the line priming, Pattern
		lest, volume lest, and B-Line Flush functions.
	Clean	Performs the Clean cycle.
	Cita	Fasters the Outgoest sife as mode
	Cyto	Enters the Cytocentrifuge mode.
	System Information	Shows the system information, including serial
1		number and software version. Allows access to
		the System Setup features. Refer to System
		Setup Menu (Section 3.1).
	Help	Opens the software Help file.
	Programs	Allows users to select or edit programs.
	Start/Load Slides	Starts a Stain or Cytocentrifuge cycle. Button is
		inactive until a program is created. Refer to
		Creating a Stain Program (Section 3.1).
		With Slide Tracking enabled, opens the Scan
		and Load Slides menu (Section 3.2).
	Number of Specimen	Selects the number of specimen slides in the
	Sindes	carouser. Users starring an odd number of
		specimen slide number icon.

# 1.3 Touchscreen and User Interface

## Table 8: Front Panel/Main Screen Function Keys (continued)

Button	Name	Description
J	Back	Returns to the previous menu.
$\overline{\mathbf{x}}$	Stop	Aborts any operation.
$\checkmark$	ОК	Indicates completion of current task.
	System Setup	Allows users to modify the software settings. See System Setup Menu (Section 3.1).

## Table 9: System Setup Keys

Button	Name	Description
	Stain Programs	Allows users to create, edit, and delete stain programs.
<b>C</b>	Cyto Programs	Allows users to create, edit, and delete cytocentrifuge programs.
Ā	Reagents	Allows users to edit reagent information.
8	Users	Allows users to create and change user accounts.
$\checkmark$	QC/Maintenance Tracking	Enables slide tracking, preventive maintenance tracking, and reagent tracking.
	Level Detect	Allows users to manage the automatic reagent level detection system.
	Language	Allows users to change the display language.
	System Log	Allows users to control logging functions.
	Network Settings	Allows users to change network settings.
	Beeper	Allows users to change audible alerts.

# 1.3 Touchscreen and User Interface

# Table 9: System Setup Keys (continued)

Button	Name	Description
31	Set Date/Time	Allows users to set the date and time.
5	Restore Defaults	Restores programming to default settings.
-2	Login	Enters Login sequence for authorized users.
<b>a</b>	Logout	Logs authorized users out. Users must log in again to use the stainer.
	Save	Saves the entered or selected information.
	Add	Enters programming mode for creating staining and cytocentrifuge programs. Also allows the system administrator to authorize new users. Allows manual entry of slide or specimen information.
Ĩ	Delete/Erase/Remove	Deletes or erases the selected item.
	Edit/Change User	Allows editing of an existing stain or cytocentrifuge program. Allows manual entry of slide or specimen information (stain or cytocentrifuge mode). Also allows system administrator to edit user information.
ø	Zero	Zeros the Level Detect sensors.
	Calibrate	Calibrates the Level Detect system.
	Unselected	Shows an unselected option.
	Selected	Shows a selected or enabled option.

# 1.3 Touchscreen and User Interface

# Table 10: Maintenance Function Keys

Button	Name	Description
	Individual Prime Buttons (A, B, C, D)	Primes the selected line.
	Pattern Test	Performs Pattern Test to ensure nozzles are clear of debris and spraying properly.
	Volume Test	Performs Volume Test to verify the selected nozzle volume is within the correct range.
	60-Sec Prime	Runs the pumps for 1 minute and primes the lines.
ore	QC/PM	Shows the Preventive Maintenance and Quality Control logs, when enabled from the System Setup menu (Section 3.1).
	Line Flush	Cleans the B and C reagent lines.
	ABCD Prime button	Primes all (A, B, C, D) reagent lines simultaneously.

## 2.1 Instrument Setup

#### **Unpacking and Installing the Stainer**

Follow this sequence if you are using this instrument for the first time. Details about these operations are given in the next three sections.

#### A CAUTION:

Contact ELITechGroup before installing the instrument if you observe any damage to the packaging or equipment.

- 1 Unpack and inspect the instrument.
- 2 Check that the contents of the boxes match the packing lists for the instrument and accessories.
- 3 Open the instrument lid and remove the cardboard tube that protects the hub.

**NOTE:** Keep the box and packaging material to repack the instrument if you intend to ship it to the manufacturer for service.

4 Place the instrument on a flat surface, free from dust and vibration and away from direct sunlight.

**NOTE:** Position the instrument with the rear panel at least 30 cm (12 in.) from obstructions or hazardous materials.



Keep the drain tube straight and as short as possible. The maximum length is 1.8 m (72 in.). The waste container must be positioned lower than the stainer.

## 2.1 Instrument Setup

## **Connecting the Drain Tube and Waste Container**



- 1 Insert the waste tube connector into the rear panel receptacle until you hear a click.
- 2 Adjust the tube length to less than 1.8 m (72 in.).

**NOTE:** Ensure the waste tube has no loops or kinks, and is as straight and as short as possible. Cut off excess tubing as needed.



3 Connect the drain tube to the waste container.

If using a waste bottle with level detect (REF: AC-182):

- 4 Connect the waste monitoring cable to the rear panel receptacle.
- 5 Connect the waste monitoring cable to the waste container lid.

#### **Connecting Power**

- 1 Make sure the power switch is **OFF** (O).
- 2 Plug the power cord into the power connector on the rear panel of the instrument.

**NOTE:** Use a surge protector to isolate the instrument from electrical spikes and surges.

- 3 Plug the power cord into a properly rated AC electrical outlet.
- 4 Turn the power switch **ON** (I). After a brief delay the Main menu will appear.



## 2.1 Instrument Setup

## **Installing Reagent Bottles**



WARNING! Reagents used in the instrument contain moderately hazardous chemicals that require care in handling. Always handle reagents using appropriate safety measures, including gloves and eye protection.

6

**NOTE:** Reagents should be stored according to the conditions specified on their label. After opening, reagents are stable until the expiration date specified on the label unless otherwise indicated by the symbol shown at left.

- 1 Place each 500 mL reagent bottle in the correct position.
  - (A) Rinse
  - (B) Thiazin Stain
  - (C) Eosin Stain
  - (D) Methanol

**NOTE:** See Appendix A for complete identification of all reagents used in this stainer.

## CAUTION:

To avoid severe damage, never use reagents containing organic solvents (such as ketones) in this instrument, unless supplied by ELITechGroup, or specified in official ELITechGroup formulation instructions.

**NOTE:** Immediately remove spills in the reagent tray to preserve the accuracy of the reagent level detecting system.

- 2 For all reagents:
  - Open a new bottle of reagent.
  - Record the reagent letter on each cap.
  - Insert the corresponding dip tube into the reagent bottle and install the ring cap.



# 2.1 Instrument Setup

## Installing the Barcode Reader

A barcode reader can be connected to the stainer for scanning reagent bottles and specimen slides that contain barcodes. This allows easy reagent and specimen information tracking. If a barcode reader is not installed, reagent and specimen information can be entered manually (Section 3.2).



#### Installing the Barcode Reader

- 1 Place the barcode reader and stand on a level surface near the stainer.
- 2 Plug the barcode reader into the left USB port on the rear panel of the stainer. See Section 3.2 for instructions on using the barcode reader.



# 2.2 Preparing the Stainer for Operation

#### **Priming Procedures**

**NOTE:** The instrument is shipped with alcohol in the reagent lines. For proper performance, this alcohol must be replaced with the correct reagent for each reagent line prior to use.

Thoroughly purge and prime each reagent delivery line using the following instructions.

- 1 Remove each spray nozzle with the provided nozzle tool by turning counterclockwise.

D

- counterclockwise.
- 2 Note the location of each nozzle so you can return it to the original position during reassembly.
- 3 Place a carousel on the stainer hub to prevent stain from entering the motor shaft.

#### CAUTION:

Fluid from priming can flood and damage the motor if the drain tube is not properly installed.

- 4 Press **Maintenance** from the Main menu.
- 5 Press the **A** prime button. Stain should appear within 10 seconds. When properly primed, a steady stream of reagent (no sputtering or breaks) flows from the nozzle receptacle.
  - If stain appears, proceed to the next step.
  - If stain does not appear within 10 seconds, perform the manual priming procedure (Section 6.3).

#### CAUTION:

Never operate a dry pump for more than 10 seconds. Operating a dry pump may cause damage to the instrument.



## 2.2 Preparing the Stainer for Operation

## Priming Procedures (continued)

6 Repeat the previous steps for each reagent line (B, C, and D).



7 Press **60-Sec Prime** to prime each reagent line with 200 mL of reagent to remove all of the alcohol from the reagent lines and pumps.



8 To prime all lines at the same time, press **ABCD**. The pumps will run for 1 minute and prime all the lines. Follow instructions on the screen.



**NOTE:** To prime individual lines, press the appropriate individual prime button (*A*, *B*, *C*, *D*).



- 9 Return the nozzles to their original positions and tighten clockwise with the nozzle tool.
- 10 With the nozzles installed, repeat Steps 5 and 6. A fine cone of spray should come from each nozzle.
- 11 After verifying nozzle performance, a clean cycle must be performed before a stain cycle can be run.

## 2.2 Preparing the Stainer for Operation

### **The Clean Cycle**

The Clean cycle is a two-step process that cleans the reagent nozzles and the carousel. The first step purges each reagent line and cleans the empty carousel with methanol or Aerofix while cycle progress is displayed on the screen. The second step, which can be delayed indefinitely, reprimes the reagent lines with staining reagents.

**NOTE**: Pressing Standby/Ready performs a System Clean cycle before the instrument goes on standby.

1 Place an empty carousel in the instrument and close the lid.



### CAUTION:

Never place any carousel loaded with specimens in the instrument for a clean cycle (including placing the instrument in standby mode). Specimens will be damaged if they contact reagents sprayed from the nozzles when you press Clean or Standby.



2 Press Clean.



**NOTE:** Pressing Stop during the Clean cycle causes the Clean Cycle Cancelled message to be displayed. Press Clean to complete the interrupted cycle.



3 Press **Reprime** to reprime the lines.



CLEAN INTERRUPTED

Clean Cycle Canceled

- 4 Open the lid and remove the carousel when the Clean cycle is complete.
- 5 Spray the interior of the bowl with 70 to 100% methanol or ethanol. Wipe the stainer bowl dry with paper towels.

**NOTE:** Perform the instrument storing procedure (Section 5.2), if the instrument will remain idle for more than 1 week.

#### **Performing Tests**

We recommend performing the Pattern Test and Volume Test before using the stainer (see Section 6).

## 2.2 Preparing the Stainer for Operation

## **Reagent Level Monitoring**

Reagent Level Detect monitors reagent levels and alerts you when the reagent is running low, or when the waste container is full (when using the waste container with level detect (AC-182)). You can turn reagent and waste container monitoring ON or OFF from the Level Detect menu. The system default is ON for reagent monitoring and OFF for waste container monitoring.

**NOTE:** The instrument must be installed on a flat, level surface for accurate reagent monitoring.

## CAUTION:

D

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B

This system is designed to warn you when the reagent level is getting low. The instrument will continue running through these warnings. Always monitor and replenish (if needed) the reagent before running a stain cycle.

#### Enabling/Disabling Reagent Level Detect



1

Press Information from the Main menu.



2 Press System Setup.



3 Press Level Detect. The display shows:



4 Press **Tray** to enable, or **OFF** to disable a reagent line. Functions are grey when unselected, blue when selected. Press **External** to enable level detect for the waste bottle.



5 When finished, press **Back** to exit to System Setup menu.

## 2.2 Preparing the Stainer for Operation

#### Zeroing the Reagent Level Sensors

The Level Detect function must be zeroed at initial setup, when the stainer is moved, or if the level detect is not reporting correctly. If zeroing does not correct the problem, recalibrate the Level Detect function (Section 7.3).

1 Press Information.



- 2 Press System Setup.
- 3 Press Level Detect to enter the Reagent Level Detect Setup menu.

**NOTE:** The stainer should be turned ON for at least 30 minutes before zeroing to stabilize level sensors. The instrument can be used during this time.

4 Press Zero. The display shows:



AGENT LEVEL DETECT SETUP

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## 2.2 Preparing the Stainer for Operation

Zeroing the Reagent Level Sensors (continued)

5 Remove all reagent bottles and press **Start**.



**NOTE:** Vibrations or bumps to the instrument or lab bench can cause inaccuracies in zeroing or calibration.



6 After zeroing, press **OK**. Press the **Back** button to exit to the System Setup menu.



7 Return the reagent bottles to their correct positions in the tray.

**NOTE:** For accurate reagent level detection and calibration, dip tubes must follow their pre-formed coiled shapes.

# SECTION 3 CONTROLLING AND CUSTOMIZING STAINER FUNCTIONS

## 3.1 System Setup Menu

Many software settings can be controlled from the System Setup menu, including:

- Creating, editing, and deleting stain programs
- Creating, editing, and deleting cytocentrifuge programs
- Tracking reagent information
- Managing user accounts
- Enabling tracking features for slides, maintenance, and reagents
- Managing reagent level sensing
- Changing the display language
- Viewing and exporting the system log
- Changing beeper settings
- Setting the date and time
- Restoring default settings

#### Accessing the System Setup Menu

1

Press **System Information** from the Main menu.



2 Press System Setup.

#### **Stain Programs**

Stain Programs allows the user to create, edit, or erase staining programs according to the user's specific staining requirements. Up to 12 staining programs can be programmed and stored in memory.

Programmable staining parameters include stain intensity and fixation options.

#### • Stain Intensity

Selections range from 1 to 10. 1 is the lightest and 10 the darkest setting. Settings 8, 9, and 10 are particularly appropriate for bone marrow specimens.

#### • Fixation

Fixation options are Off, Normal, and High.
### 3.1 System Setup Menu

### **Creating a Stain Program**

1 From System Setup, press Stain Programs. STAIN PROGRAMM Intensity: Medium - 4 Fixation: Normal 2 Press Add. 3 Select Enter Program Name, and enter the desired name on the keypad. Ш Press Enter on the keypad. The display returns to the Stain Programming 4 Menu. Select Intensity From the Stain Programming Menu. Select the desired 5 stain intensity (1-10). 2 4 10 Select the desired Fixation (Off, Normal, High). 6

7

2

### Editing, Renaming, or Adjusting Stain Programs

Press Save.

1 From Stain Programs menu select the program to be modified.





Press **Edit**.

### 3.1 System Setup Menu

#### Editing, Renaming, or Adjusting Stain Programs (continued)



3 Adjust the settings as needed.



#### Administrator and User Accounts

You can create one Administrator account and multiple (up to 50) user accounts. The Administrator controls access to the system by adding and editing user accounts. Users cannot edit System Settings unless permitted by the Administrator.

#### **Creating an Administrator Account**

1 From System Setup, press Users.





Enter a password for the Administrator account (at least 4 characters) and press Enter.



4

Re-enter the password and press Enter to confirm.

### 3.1 System Setup Menu

#### **Creating User Accounts**

Note: This function is available only if an administrator account has been created.



Press System Setup. 1



Enter the Administrator password. 2





Press Enter.

3

4



Press Users to reveal the Manage Users menu.



Select Enable Global Login.



6

7

8

Select Add User.

Enter New User Name User1

Enter a new user name.



Press Enter.

### 3.1 System Setup Menu

#### **Creating User Accounts (continued)**

9 Enter a numeric passcode (at least 4 numbers) for the user account.



10 Press Enter.



12 Press Enter.



#### Managing User Access

From the Manage Users screen, the Administrator has several options to manage user access to the instrument.

- Enable Global Login allows users to log in to the instrument. Users will log out manually or automatically (with user-selectable time options). See User Login/Logout below.
- Enable Run Login requires the current user to enter a password to run a Stain or Cytocentrifuge cycle. Global Login must be enabled to use this option.
- User System Access enables complete control of the instrument, including changing the System Setup options. This option can be controlled on an individual user basis, if Global Login is enabled.

#### User Login/Logout

With System Access locked and Global Login enabled, users must log in to use the stainer:



1 Select **User ID** and **Select Logout** time after idle from the drop-down menu.

**NOTE:** Users can select how long the stainer can be idle before automatically logging the user out.

### 3.1 System Setup Menu



3

User LogIn/Logout (continued) 2 Press Login.



Enter the correct passcode for the selected user and press Enter.



4 Once Login is complete, the display advances to the Main screen and the instrument is ready for programming and staining. A Logout button and the user name appear at the top right of the Main screen.

**NOTE:** Users can log out manually by pressing the logout button.



### 3.1 System Setup Menu

#### **Using Reagent Information Tracking**

You can enter reagent information to help track reagent usage and expiration. Reagent information includes reference number, expiration date, lot number, date and time the reagent was last installed.



- 2 Select **Enable Reagent Tracking** by choosing reagent A, B, C, or D. This enables reagent lot number and expiration date tracking.
- 3 Press **Back** to return to System Setup.
- 4 Press Reagents.
- 5 Press Change next to the appropriate reagent.
- 6 Scan the reagent bottle barcodes (Section 3.2) or manually enter the reagent information in the correct fields.
- 7 Press Save for each reagent.

#### **Modifying Level Detect Functions**

The Level Detect function alerts you when the reagent is running low, or when the waste container is almost full. You can turn reagent and waste container monitoring ON and OFF from the System Setup screen. The system defaults to ON for reagent monitoring and to OFF for waste container monitoring. See Section 2.2 for complete instructions.



From System Setup, press Level Detect.

2 Select the reagent monitoring options to be modified.

- To disable monitoring, press **OFF** next to the appropriate reagents.
- To enable monitoring, press **Tray** next to the appropriate reagents.
- To monitor the waste container, press External.



2	REAGENT INFORMATION			4-
	REF	Expiration Date	Lot Number	Serviced Date/Time
Change				
Change				
Change C				
Change D				

AGENT LEVEL DETECT SETUP

### 3.1 System Setup Menu

#### **Changing User Language**

1



From System Setup, press Language.

2 Select the software language from the list on the left.



Press **OK**.

#### Setting the Date and Time

1

From System Setup, press Set Date/Time.



- 2 Select **12** for a 12-hour clock or **24** for a 24-hour clock.
- 3 Use the up and down arrows to modify the time and date.



4

1

Press Save.

#### System Log

The instrument records all login, logout, stain or cytocentrifuge cycles, setting changes, maintenance functions and specimen identification (if enabled).

#### Accessing Logs



From System Setup, press System Log.

2 Use navigation arrows to scroll through the log.



### 3.1 System Setup Menu

### System Log (continued)

#### **Exporting Logs**

1 From System Setup, press System Log.



- 2 Plug a Flash Drive into the right USB port.
- 3 Press Export.



**NOTE:** The log files are exported to the Flash Drive as a CSV file that can be used in spreadsheet software programs.

### **Controlling Beeper Alerts**



2	BEEPER VOLUME	
Cycle Complete	-0	
Warnings	-0	
Errors		
Key Clicks		
Beep On Startup		

- 2 Use the sliders to modify the beeper volume for Cycle Complete, Warnings, Errors, or Key Clicks.
- 3 Press Beep On Startup to turn the audible startup alert ON or OFF.

### 3.1 System Setup Menu

#### QC/Maintenance Tracking

Under system default settings, the following QC/Maintenance Tracking options are disabled:

- Stain Slide Tracking
- Cyto Slide Tracking
- Manual Entry
- Preventive Maintenance Tracking
- Reagent Tracking

#### Enable Stain Slide Tracking

To activate Stain Slide Tracking:

1 From System Setup, Press QC/Maintenance Tracking.



2 Press Enable Stain Slide Tracking.



3 Press **Back** twice to return to the main screen. Verify that the Start Button on the main screen reads "Load Slides."

**NOTE:** Selecting Enable Stain Slide Tracking changes the Start button on the Main menu to "Load Slides."

4 Press Load Slides. The Scan and Load Slides menu appears.



- 5 Enter slide information.
  - a. If using the barcode reader, scan the specimen slides that contain barcodes. See Scanning Slides with the Barcode Reader (Section 3.2).
  - b. If entering specimen information manually, see Manually Entering Specimen Information (Section 3.2).
- 6 See Section 4 for remaining steps for running a stain cycle.



### 3.1 System Setup Menu

#### **Enable Cyto Slide Tracking**

Allows slide tracking in cytocentrifuge mode. See the Cytopro Rotor Applications Manual (Aerospray Models 7xx2) (REF: RP-517) for complete information.

#### **Enable Manual Entry**

If selected, allows manual entry of slide information using the keypad (limited to 24 characters).

#### **Enable Preventive Maintenance Tracking**

To activate the tracking prompts for Preventive Maintenance Tracking, use the following steps:

- 1 From System Setup, select QC/Maintenance Tracking.
- 2 Select Enable Preventive Maintenance Tracking.

3 Enter the information for the Daily, Weekly, and QC Slide prompts in corresponding fields. See Using the Preventive Maintenance Log (Section 5.1).

#### Enable Reagent Tracking

To activate Reagent Tracking:

1 From the **QC/Maintenance Tracking** menu, select the reagent (A, B, C, D) to be tracked.









### 3.1 System Setup Menu

#### **Restoring Software Defaults**



1 From System Setup, select **Restore Defaults**.



#### CAUTION:

Restoring the system defaults will remove all personal settings.

- Restoring System Settings will delete all user names and passwords.
- Restoring Stain Settings will delete all stain programs and restore the default programs.
- Restoring Cytocentrifuge Settings will delete all cytocentrifuge programs and restore the default programs.
- 2 Select the settings you would like to restore to factory defaults: System Settings, Stain Settings, or Cytocentrifuge Settings.



Restoring Defaults Please Wait

RESTORE FACTORY DEFAULTS

4 The display returns to the Main menu.

### 3.2 Recording Specimen and Reagent Information

### Scanning Slides with the Barcode Reader



1 From System Setup select **QC/Maintenance Tracking.** 



SCAN AND LOAD SLIDES

2 Select Enable Stain Slide Tracking.

**NOTE:** Selecting Enable Stain Slide Tracking changes the Start button on the Main menu to "Load Slides."

- 3 Press **Back** twice to return to the Main menu.
- 4 Press **Load Slides** on the Main menu. The Scan and Load Slides menu will appear.



- 5 Scan the barcode of each slide in the batch and load into the carousel according to instructions in Section 4.1.
- 6 Verify that each barcode appears on the Scan and Load Slides menu.



7 When you have completed preparations to stain, (Section 4.1) press Start.

### 3.2 Recording Specimen and Reagent Information

#### Scanning Reagent Bottles with the Barcode Reader





Select Enable Reagent Tracking for each desired reagent (A, B, C, D).



- 3 Press **Back** to return to the System Setup menu.
- Ā
- 4 Press **Reagents** to reveal the Reagent Information screen.



5 Select the desired Reagent (A, B, C, D) and press **Change**.



Change



- 6 Scan the barcode of each enabled reagent bottle.
- 7 Verify that the barcode appears on the Scan and Load Slides menu.

### 3.2 Recording Specimen and Reagent Information

### Scanning Reagent Bottles with the Barcode Reader (continued)



8 Press Save.

9 Repeat steps 3-8 for each reagent bottle that is enabled in QC Maintenance Tracking.

**NOTE:** You can access Reagent Information by pressing the bottle icons on the right side of the Main menu. This takes you directly to Reagent Information menu, where you can scan or manually enter reagent information by pressing Change.

#### **Manually Entering Specimen Information**

With Stain Slide Tracking and Manual Entry enabled in the QC Maintenance menu:



1 Press Load Slides on the Main menu.



2

5

Press Add to reveal the keypad.



3 Enter slide information (maximum of 24 characters) and press Enter.



4 To change or delete the entry, select the entry on the display and press **Edit** or **Remove**.



Load slides and run stain cycle as shown in Section 4.1.

**NOTE:** Reagent REF number must be a valid ELITechGroup REF number for the selected reagent. Incorrect entries will generate an error message.

### 3.2 Recording Specimen and Reagent Information

#### Manually Entering Reagent Information

1 Press **Reagents** from the System Setup menu, or press the reagent status icon on the Main menu to reveal the Reagent Information menu.



	R	EAGENT INFOR	MATION	
	REF	Expiration Date	Lot Number	Serviced Date/Time
Change A				
Change B				
Change				
Change				

### Change

3

	Scan Bar Cod	e or Enter Information
	Reagent REF:	
	Expiration Date:	
	Lot Number:	
	Serviced Date/Time:	Serviced Date/Time
		Save
		ريك
2	REAGENT Scan Bar Coo	A INFORMATION
	Reagent REF:	SS-035A
	Expiration Date:	2014-11-27
	Lot Number:	1234567
	Serviced Date/Time:	2013-09-12 12:26
	and a state of the	

REAGENT & INFORMAT

- Select the desired field (Reagent REF, Expiration Date, Lot Number, or Service Date/Time).
- 4 Enter the information on the keypad and Press Enter.

Select the desired reagent and press Change.

5 Press Save.

### 3.3 The Help Menu

The Help menu is a comprehensive onscreen help function that provides detailed information on the following subjects:

#### Help Screens Basic Operation

- Loading the Carousel
- Programming Number of Slides
- Select Intensity Setting
- Correct Reagents and Locations
- Selecting a Staining Program

#### Touchscreen

### Calibrating the Touchscreen

### Cleaning

Clean Cycle

#### Using Help

1 Press **Help** to access the help function.



- 2 Select the desired topic.
- 3 Use the direction arrows to navigate.



4 Press **Exit** to return to the Main menu.

### 4.1 Operating Instructions

#### WARNING!

Treat slides in accordance with good laboratory practices and local regulations.

#### **Suggested Staining Protocol**

- Hub Pattern Test (once per day).
- Select or verify desired stain program.
- If slide tracking is enabled, scan or enter slide information.
- Load slides into the carousel. Use blocking slides if needed.
- Place loaded carousel into the stainer and close the lid.
- Check reagent and waste levels.
- If slide tracking is not enabled, enter the number of slides on the Main menu.
- Perform a stain cycle.
- Unload the carousel.

#### Performing a Hub Pattern Test

Use the Hub Pattern Test to ensure the nozzles are clear of debris and spraying properly.



- 1 From the Maintenance menu, Press **Pattern Test.**
- 2 Hold a sheet of white paper towel near the drive hub, squarely facing the target nozzle.
- 3 Press the corresponding prime button.

Check the pattern. If incorrect, clean the nozzle orifice with the nozzle brush provided in the Nozzle Maintenance Kit. If this fails to correct the problem refer to Nozzle Maintenance and Performance (Section 6).

#### Figure 7: Correct Hub Pattern Test Result



Figure 8: Incorrect Hub Pattern Test Result



### 4.1 Operating Instructions

#### Loading the Carousel

#### CAUTION:

Never load chipped or cracked slides into the instrument. Slides in poor condition may break during the staining cycle. If a slide breaks in the bowl, see Cleaning Broken Slides (Section 5.4).



Keep small ferrous metal objects away from the lab bench. These objects can be attracted to the magnets on the bottom of the carousel and cause damage if spun free during instrument operation.



Load slides in balanced pairs. If staining an odd number of slides, use a blank slide to balance the carousel.

**NOTE:** Load the carousel with similar specimens for a similar level of staining. There is no guarantee of staining performance when dissimilar specimens are used.

1 Remove the carousel from the bowl and place it on a solid, level surface.



2 Remove the carousel lid by pressing the button and lifting the lid.



- 3 If Slide Tracking is enabled, press Load Slides.
  - If using the barcode reader, scan each specimen slide barcode before loading it into the carousel. Slide Tracking must be enabled from the System Setup menu. See Enable Stain Slide Tracking (Section 3.1).
  - If entering slide information manually, follow the instructions in Section 3.2.

4 Insert the slides into the carousel with the first slide in position 1.

- Load slides in balanced pairs (directly opposite one another) to balance the carousel. If staining an odd number of slides, use a blank slide to balance the carousel.
- If there are empty slots in the carousel, use blocking slides to prevent overspray (see below).



### 4.1 Operating Instructions

#### Loading the Carousel (continued)

- Load slides with the labels toward the outside edge of the carousel.
- Always load slides with the specimen facing clockwise.
- Always place the first slide in position 1, the second in position 2, and so on.

**NOTE:** A warning will sound during the staining cycle if the carousel is unbalanced.

#### Figure 9: Loading the Carousel



#### Figure 10: Specimen Placement on Slide



5 Replace the carousel lid by pressing the button and lowering the lid over the indexing posts.



6 Release the button and press the lid handle until it is firmly closed and locked.

### 4.1 Operating Instructions

#### **Using Blocking Slides**

If the carousel is not full, blank slides should be used as blocking slides. Blocking slides prevent overspray of reagents onto the specimen slides. Overspray can cause slides to become over-stained.

• Place a blocking slide in front of position 1 and 2.

#### Figure 11: Using Blocking Slides



4 – Slide Position 4

#### Performing a Stain Cycle

1 Insert a carousel loaded with specimen slides and close the instrument lid.



2 If you have not enabled Slide Tracking, select the number of slides to be stained. Slide selection defaults to full carousel at the end of the run, after pressing Stop, or selecting a number greater than the full carousel default.

**NOTE:** To stain an odd number of specimen slides, select the next higher number listed on the display. For example: to stain 3 slides, select 4, etc.



**NOTE:** If entering slide information by barcode reader or keypad, the number of slides is programmed automatically. Adjust the total number of slides if adding other specimen slides that have not been entered by barcode reader or keypad.

**NOTE:** Do not include blocking slides in the total number of slides.

### 4.1 Operating Instructions

#### Performing a Stain Cycle (continued)



RUNNING STAIN CYCLI

Þ 🚺

Wash

If you have created a stain program, and it appears on the display, proceed to Step 4. If the desired program does not appear on the display, press
Programs. Then select the desired program and proceed to Step 4.

**NOTE:** No special collection, pre-treatment, or storage conditions are required for specimen types. Specimens that are normally manually hematology stained can be stained with the Hematology Stat Stainer. Adjust stain settings to maximize staining quality for each specimen type (see Section 3.1).

4 Press **Start**. The display shows the progress of the program, and a signal tone (if enabled) indicates the end of the cycle.

**NOTE:** Use the emergency Stop button when required, for example, if there is abnormal vibration or noise. This will abort the staining cycle.

#### **Unloading the Carousel**

1 Remove the carousel from the bowl and place it on a solid, level surface.



- 2 Remove the carousel lid by pressing the button and lifting the lid.
- 3 Carefully remove each slide and observe the specimen using a microscope.

### 4.1 Operating Instructions

#### **Monitoring Reagent and Waste Levels**

If enabled, the stainer displays the approximate reagent and waste container levels and other information.

#### 

C

B

A

You must monitor the reagent and waste container levels on the display (if enabled) and by direct inspection of the bottles. The monitor will show the approximate level of each reagent. This can be compared to the actual level in the bottles.

- Never allow a reagent to run dry. When the reagent level is near empty, replace the reagent bottle with a new one (see below).
- Never allow the waste container level to go above the maximum safety level.

#### Table 11: Reagent Level Detect Display Symbols

A	Reagent unselected in Level Detect
B	Reagent Bottle Full
B	Reagent Bottle 2/3 Full
B	Reagent Bottle 1/3 Full
<b></b>	Reagent Bottle Empty
!	Measurement Error (internal level detect problem)
	Reagent has exceeded expiration date (enabled from QC Maintenance menu)
	Waste bottle empty
	Waste bottle error (such as external bottle unplugged)
	Waste bottle full

### 4.1 Operating Instructions



**NOTE:** Access the Reagent Information menu by pressing the bottle icons on the right side of the Main menu. Press **Change** to scan or manually enter reagent information.

**NOTE**: Do not put residual reagent from a used bottle into a new bottle. This can lead to an accumulation of residue on the slides and may be a source of contamination.

#### \Lambda WARNING!

Reagents used in this instrument contain moderately hazardous chemicals that require care in handling. Always use appropriate safety measures, including gloves and eye protection, when handling reagents.

#### **Replacing a Reagent Bottle**

- 1 Remove the empty reagent bottle from the tray but do not disconnect the dip tube.
- 2 Open the new bottle and record the letter on the cap for future use, such as long-term storage.
- 3 Open the Reagent Information menu by pressing the reagent bottle icon on the right side of the Main menu.
- Change
- 4 Select the desired reagent and press Change.
- 5 If you are using reagent tracking, scan the barcode or manually enter the reagent REF, expiration date and lot number in the Reagent Information menu (Section 3.2).
- 6 Unscrew the cap and remove the dip tube from the empty bottle.
- 7 Insert the dip tube into the new reagent bottle and screw on the cap.
- 8 Place the new bottle in the tray.

#### **Emptying the Waste Container**

The Level Detect function automatically monitors the waste level and indicates when the waste container should be emptied. It is still necessary to check waste levels visually to ensure the waste container does not overfill.

#### CAUTION:

^b Dispose of collected waste according to local statutes and safety requirements.



- 1 Unscrew the cap from the full waste container.
- 2 Discard the waste according to local regulations.
- 3 Reinstall the cap on the empty waste container.

### 5.1 Preventive Maintenance

The system provides a Preventive Maintenance Log for tracking the most recent maintenance activities. See Enable Preventive Maintenance Tracking (Section 3.1) and Using the Preventive Maintenance Log in this section.

#### Daily Maintenance/Quality Control (QC)

- 1 Check reagent levels and expiration dates.
- 2 Empty the waste container if necessary.
- 3 At the beginning of the day:
  - Perform a Hub Pattern test.
  - Run a QC slide if required by your laboratory.
- 4 If necessary, use the nozzle brush from the Maintenance Kit to clean the nozzle orifices. Press the individual bristles into the nozzle openings.
- 5 At the end of the day:
  - Place an empty carousel in the bowl and close the lid. Press **Standby/Ready** on the front panel and wait until the end of the automatic cleaning process.
  - Spray and wipe the bowl, interior lid, and nozzles with 70 to 100% alcohol.
  - Wipe down the exterior of the instrument with 70 to 100% alcohol.
- 6 Ensure the maintenance procedures listed on the Maintenance Log have been performed, and entered into the chart or log.

#### Weekly Maintenance

- 1 Wipe the carousel tray and lid using 70 to 100% alcohol.
- 2 Flush the waste tube with 200 to 300 mL of alcohol to prevent clogging.
- 3 Perform a Volume Test (Section 6.4).
- 4 Perform a Hub Pattern Test (Section 4.1).
- 5 Manually clean the nozzles if necessary.
- 6 Ensure the maintenance procedures listed on the Maintenance Log have been performed, and entered into the chart or log.

### 5.1 Preventive Maintenance

#### **Monthly Maintenance**

- Disassemble and manually clean all nozzles. Refer to Nozzle Disassembly 1 and Cleaning (Section 6.1).
- 2 Disinfect any reagent bottle that is being reused (Section 5.5).
- 3 Ensure the maintenance procedures in the Preventive Maintenance (PM) Log have been performed, and entered into the PM chart or log.

#### Using the Preventive Maintenance Log

With Preventive Maintenance Tracking enabled, the PM Log provides a convenient and structured means of recording important maintenance and QC functions. The system allows you to set up timely prompts that require response by the user. See Enable Preventive Maintenance Tracking (Section 3.1).

From the Maintenance menu, press QC/PM to open the PM Log. 1



- QC Slide Staining (Drop Down Menu) Not Completed Acceptable Unacceptable Inconclusive **Disinfect Reusable Bottles** Completed (Select/Deselect) **Drain Check** 
  - Completed (Select/Deselect) Manual Nozzle Cleaning Completed (Select/Deselect)

### 5.2 Storing the Instrument

If the instrument is inactive for more than one week, you may want to perform the long-term storage procedure. This will prevent nozzles from clogging when the machine is reactivated.

#### **Preparing for Long-Term Storage**

- With the carousel removed, remove and clean the nozzles. Store parts in 1 tubes that are labeled to indicate their correct position.
- 2 Unscrew the cap and remove the dip tube from the bottles.
- Place the end of the dip tube in a bottle of methanol. 3
- Flush at least 250 mL of methanol through each reagent line by priming all 4 lines simultaneously. Leave the alcohol in the line.



#### CAUTION:

Leave methanol in the reagent lines during storage. Allowing reagent lines to run dry can damage the instrument.

#### CAUTION:

Do not subject the instrument to freezing temperatures. Freezing of aqueous fluids in the lines may cause damage to the instrument.

- 5 Flush the bowl with water.
- 6 Return nozzles to their original positions.

#### **Preparing for Operation after Storage**

Follow the Setup and Preparation for Operation instructions (Section 2).

### 5.3 Replacing Fuses

MARNING! To prevent the risk of fire, the main fuses should only be replaced with fuses of the same type and rating. Recurring fuse failure indicates serious internal problems, if this occurs, contact ELITechGroup.

- 1 Power **OFF** the instrument.
- Disconnect the power cord from the power outlet and the rear panel of 2 the instrument.
- 3 Open the fuse cover by inserting a screwdriver in the slot on the right side of the cover and gently prying the cover open.
- Remove the fuse holders to inspect the fuses. 4

Replace the fuses if necessary.

- 6 Push the fuse holders in.
- 7 Close the fuse cover.
- 8 Reconnect the main power cord to the rear panel of the instrument and to the power outlet.
- 9 Power **ON** the instrument.

### 5.4 Cleaning the Stainer and Carousels

#### WARNING!

All cleaning procedures should be performed in a well-ventilated room by authorized and trained personnel wearing appropriate protection equipment.

- 1 Clean the outside of the instrument with 70 to 100% ethanol or methanol.
- 2 Clean the carousel and lid with 70 to 100% ethanol or methanol.

**NOTE:** Freshly prepared (< 24 hours old) 10% bleach solution can be used as well. The 10% bleach solution helps clean the stained areas.

#### **Cleaning Liquid Spills**

Remove any liquid spilled on the instrument immediately to avoid damage to the equipment.

#### \land WARNING!

If potentially infectious liquid is spilled on the instrument, the instrument must be disinfected in accordance with all applicable local regulations. Refer to Decontaminating the Stainer and Carousels (Section 5.5) for instructions.

#### **Cleaning Broken Slides**

You must take stringent precautions if a slide breaks inside the instrument during a staining cycle, especially if the instrument has been processing dangerous pathogens. Always use protective gloves, safety glasses, and forceps when removing broken glass from inside the instrument.

- Glass shards embedded in the walls of the bowl can cause serious cuts and pose a risk of infection.
- Always remove embedded shards with a scraper before attempting to remove loose glass.
- Use a vacuum or adhesive tape to pick up loose glass inside the stainer bowl.

### 5.5 Decontaminating the Stainer and Carousels

All parts of the instrument that come into contact with biological specimens, patient specimens, positive control specimens, or hazardous material must be treated as potentially infectious.

Before the instrument is returned for service, all outer surfaces must be decontaminated. The operating authority must complete a disinfection declaration, otherwise the instrument may be rejected by the distributor or service center or guarantined by customs authorities.

#### WARNING!

Reagents used with the instrument contain moderately hazardous chemicals that require care in handling. Always use appropriate safety measures including gloves and eye protection, when handling reagents.

#### WARNING!

Authorized and trained personnel wearing appropriate protection equipment should perform the decontamination procedure in a well-ventilated room. It is very important to thoroughly decontaminate the instrument before removing it from the laboratory or before performing any technical service. This procedure may not be effective against prions.

#### WARNING!

Prior to decontaminating, disconnect the instrument from the main power supply to avoid any risk of fire or explosion.

#### WARNING!

The decontamination procedure and the disinfectants must comply with the local applicable regulations.

#### Solutions for Decontaminating the Instrument

The outer surfaces of the instrument should be decontaminated using a decontaminating solution such as:

- 70% ethanol or methanol •
- Mild detergent •
- 10% bleach solution (< 24 hours old) ٠
- Decontamination Solution (REF: SS-133)

### 5.5 Decontaminating the Stainer and Carousels

Figure 12: Lid Latch and Locking Pin Hole Locations



#### **Decontaminating the Instrument**

- 1 Prepare a suitable container for all disposables.
- 2 Cover the lid latch and locking-pin holes with waterproof tape to protect the interior (Figure 12).
- 3 Place the instrument in a biological safety hood or well-ventilated area.
- 4 Spray the inner bowl and inner lid with a decontaminating solution such as REF: SS-133.
- 5 Repeat the spray treatment every 2 or 3 minutes for a total of 20 minutes. Do not allow cleaning solutions to dry on the instrument surfaces.
- 6 Rinse the inner bowl and lid thoroughly with water.
- 7 Spray and wipe the exterior surfaces with decontamination solution such as REF: SS-133.



Do not flood the display panel with excessive moisture. Any moisture that seeps through could damage the internal electronics.

### 5.5 Decontaminating the Stainer and Carousels

#### Decontaminating the Instrument (continued)

- 8 Repeat the spray treatment of exterior surfaces every 2 or 3 minutes for a total of 20 minutes. Do not allow cleaning/decontamination solutions to dry on the instrument surfaces.
- 9 Wipe surfaces thoroughly with a cloth soaked in water until you have removed all decontamination solution.
- 10 Immerse or generously spray the carousel and lid with decontaminating solution. Allow the solution to react for 20 minutes.
- 11 Thoroughly rinse the carousel and lid with deionized or distilled water.

#### **Decontaminating Reagent Bottles**

Any reused reagent bottles should be disinfected at each reagent lot change, or monthly:

- 1 Fill the reagent bottle with a fresh (< 24 hours old) 10% bleach solution.
- 2 Allow the bleach solution to react in the bottle for 10 minutes.
- 3 Rinse the bottle thoroughly with tap water.
- 4 Rinse the bottle thoroughly with deionized or distilled water.

### 5.6 Shipping or Disposing of the Stainer or Carousels

#### Shipping the Instrument or Carousels



You must disinfect the instrument or carousels before returning it to ELITechGroup. The operating authority must complete a Hazard-Free Certification form, otherwise the distributor or service center may not accept the instrument; or customs authorities may hold it.

#### A CAUTION:

Shipping the instrument or carousels without decontaminating according to these instructions is dangerous to service personnel. You will be charged additional fees for decontamination performed by ELITechGroup.



Ship the instrument or carousels in containers comparable to the original packaging.

#### **Hazard-Free Certification**

The operating authority must print and complete the Hazard-Free Certification (obtained from ELITechGroup Customer Service).

Attach the certification form to the top of the instrument package before sending the package to ELITechGroup.

#### **Disposing of the Instrument or Carousels**

The instrument and carousels should be completely decontaminated and disposed of as follows:



Under WEEE Directive 2002/96/EC, this equipment cannot be disposed of in a normal landfill. Instead, the equipment must be disposed of either by:

1 Routing to an authorized local facility approved for handling hazardous materials.

OR

2 Returning the equipment to ELITechGroup.

### 6.1 Nozzle Disassembly and Cleaning

Nozzle maintenance requires the Nozzle Maintenance Kit and prepared Nozzle Cleaning Solution (diluted REF: SS-029C).

#### WARNING!

Always wear protective clothing and eye protection when using Nozzle Cleaning Solution (diluted REF: SS-029C). Dispose of used solution properly.

**NOTE:** If the compression screw cannot be easily loosened, use light penetrating oil and a 5/8-in. wrench to loosen the nozzle.

#### **Nozzle Disassembly**

1



Remove the nozzle using the nozzle tool from the Nozzle Maintenance Kit.

- - Disassemble the nozzle. See Figure 5: Nozzle Diagram in Section 1.
  - 3 If you will be storing the nozzle parts in Nozzle Cleaning solution longer than one hour, remove the o-ring.
  - 4 Place the nozzle parts (minus the o-ring if required) in a 50 mL conical tube that has been clearly marked with the correct nozzle position.
  - 5 Repeat Steps 1 through 4 for each nozzle.

#### **Nozzle Cleaning**

1 Fill each 50 mL tube with 25 mL of prepared Nozzle Cleaning Solution (REF: SS-029C) and cap the tube.

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- 2 Gently invert the tube at least ten times to ensure all parts come in contact with the cleaning solution.
- 3 Place the tube in the correctly marked position in the provided tube stand. Soak the parts as long as possible.

**NOTE:** Soak nozzle parts for at least 15 minutes. Parts can be soaked in Nozzle Cleaning Solution overnight.

4 Repeat steps 1 through 3 for each nozzle.



### 6.2 Nozzle Reassembly



**NOTE:** You must perform the Hub Pattern Test and Volume Test before operating the instrument. If the results are incorrect, manually prime the

13 Perform a Volume Test (Section 6.4).

instrument.

### 6.3 Manual Priming

- 1 Remove the carousel from the bowl.
- 2 Remove the nozzle connected to the line to be manually primed.
- 3 Insert the priming tool nozzle adapter (included in the Nozzle Maintenance Kit) into the nozzle holder and turn it clockwise to install the adapter into the holder.
- 4 Withdraw the priming tool plunger halfway to create a vacuum. Hold the plunger in that position.
- 5 Press Maintenance from the Main menu.
- 6 Press Volume Test.
- 7 Press the desired prime button to start the reagent pump.
- 8 Run the reagent into the tube until the fluid is free of bubbles, then press **Stop**.

#### WARNING!

Do not pull the plunger completely out of the priming tool. Pulling the plunger out of the tool may result in splashing or spraying of reagents. Do not push the plunger in while it is connected to the nozzle holder.

- 9 Turn the nozzle adapter counterclockwise to remove it from the nozzle holder.
- 10 Discard the collected fluid into the stainer bowl.
- 11 Reinstall the nozzle.
- 12 Perform a Hub Pattern Test.
- 13 Perform a Volume Test.



### 6.4 Performing the Volume Test

The Volume Test requires the Nozzle Maintenance Kit.

**NOTE:** The Volume Test must be performed weekly.



- 2 Hold a Volume Test tube (small tube) to cover the selected nozzle.
- 3 Press the corresponding reagent prime button to collect the reagent.

**NOTE:** With QC/Maintenance tracking enabled, enter the measured volume on the keypad and press ENTER. With QC/Maintenance Tracking disabled, the menu returns to the Maintenance menu.

4 Remove and cap the tube.



- 5 Record the nozzle position on the tube and place the tube in the appropriate position in the tube stand.
- 6 Repeat Steps 2 through 5 for each nozzle.
- 7 Compare collected nozzle volumes with the following table.

#### Table 12: Volume Test Tolerances

Nozzle/Reagent Line	Minimum	Maximum
А, В, С	9.0 mL	11.0 mL
D	8.5 mL	10.5 mL

**NOTE:** The stainer normally functions correctly if nozzle volumes are slightly higher or lower than the specified range. It is important that the B and C nozzle volumes are similar, (typically within 1 mL). Spray volumes < 7.5 mL or > 13.0 mL indicate serious problems with the nozzles or reagent delivery lines.

- If the volume is within the tolerance range, go to Step 9.
- If the volume is outside the tolerance range:
  - a. Clear the nozzle orifice with the nozzle brush found in the maintenance kit.
  - b. If necessary, remove the nozzle and perform the Nozzle Cleaning procedure (Section 6.1).
  - c. If the problem persists, replace the nozzle.

**NOTE:** If the problem persists after you have replaced the nozzle, contact *ELITechGroup*.


## SECTION 6 NOZZLE MAINTENANCE AND PERFORMANCE

### 6.4 Performing the Volume Test

- 8 Prepare the Maintenance Kit for future use:
  - Empty the contents of the tubes into the stainer bowl.
  - Rinse the tubes with water.
  - Put the tubes back into their original place in the Maintenance Kit or tube stand.
- 9 Press **Back** twice to return to the Main menu.

### SECTION 6 NOZZLE MAINTENANCE AND PERFORMANCE

### 6.5 Performing the Slide Pattern Test

This test can differentiate poor staining results from sample preparation problems, or nozzle obstructions. Perform the Slide Pattern test when a Hub Pattern test produces a normal result, but staining is still inadequate.

- 1 Place a 1 x 3 inch (2.5 x 7.6 cm) piece of paper (REF: RP-500) in positions 1 and 2 of the carousel, with a blocking slide in front of positions 1 and 2.
- 2 Load the carousel into the stainer and close the lid.



3 From the Main menu, press Maintenance.



4

- Press Pattern Test.
- 5 Press the corresponding prime button for the reagent line to be tested.
- 6 Remove the paper slides.
- 7 Repeat Steps 1 through 6 for each reagent line.
- 8 Examine the paper slides for each reagent. The pattern on the slide should be uniform, without any continuous lines or streaks.

### Figure 13: Correct Slide Pattern Test Result



Figure 14: Incorrect Slide Pattern Test Result



9 If the result is incorrect, clear the nozzle blockage using the nozzle brush, or disassemble and clean the nozzle (Section 6.1).

### 7.1 Troubleshooting

The following table is to help identify and solve routine problems with the stainer. More difficult problems may require technical service. Contact your ELITechGroup representative for assistance.

### WARNING!

Due to the electrical shock hazard, do not open this instrument or attempt internal repairs. Refer servicing to qualified service personnel. Contact your dealer or ELITechGroup Service.

Problem	Solution
There is no power to the stainer when the power switch is turned ON.	Check the facility outlet and the power cord connection. Check the fuses. Refer to the Replacing Fuses procedure. CAUTION:
	Fuse failure may indicate a serious internal problem.
Strange information shows on the display, and/or erratic stainer operation.	Switch the power <b>OFF</b> , wait 10 to 20 seconds, then switch power <b>ON</b> again. If problem recurs, install a computer-type surge suppressor to protect the instrument from power line transients. If possible, connect the stainer to a power circuit that is not shared by centrifuges, refrigerators, air conditioners, or other motorized equipment.
	Aerospray Service Manual, or contact your dealer or ELITechGroup for assistance.
A reagent line will not prime when power is ON and you press the prime button.	Follow the procedures in Section 6.3 for priming reagent pumps.
A reagent line will not prime, even with the priming tool (Section 6.3).	Press the priming button and listen carefully for the sound of the pump. If you can hear the pump, try the priming tool again. If the problem is not solved or if you cannot hear the pump there may be an internal problem. Contact your dealer or ELITechGroup for assistance.
Stainer bowl fills with reagent after use.	A small puddle of stain around the drain inlet or the bottom of the bowl is normal. If the bowl is filling with a large quantity of stain, check the external drain tube for blockage. Make sure the drain tube is properly connected and running continuously down toward the lab drain or vented waste container, with no loops, rises, or obstructions. Make sure the end of the tube is not submerged. This can prevent proper drainage. The internal drain may need to be cleaned or replaced. See the Aerospray Service Manual, or contact your dealer or ELITechGroup Service.

#### Table 13: General Troubleshooting and Diagnosis

# 7.1 Troubleshooting

Problem		Solution
Stain is leaking onto th	ne counter.	Check all external reagent lines for visible signs of cracks or loose fittings.
		Make sure the drain outlet is not blocked.
		Make sure the drain tube is securely attached to the drain port and that the tubing is not cracked or deformed.
		Reagent leaks may indicate an internal problem (see Section 7.3). See the Aerospray Service Manual, or contact your dealer or ELITechGroup for further assistance.
Error messages on the	screen.	If the display shows Lid Not Shut: Verify that the lid is fully closed and latched. If the Lid Not Shut indication remains, contact ELITechGroup for assistance.
	Wrong Rotor ERROR: 0002	If the display shows Wrong Rotor after pressing Start: Make sure the slide carousel is properly loaded on the drive hub. In staining mode, the instrument detects whether the staining carousel is present before proceeding. In cytocentrifuge mode, the instrument will stop if it senses the staining carousel. After verifying the carousel is correctly loaded, press <b>Start</b> . If the display still shows Wrong Rotor, there may be an internal problem. Check for missing carousel magnets.
		The microprocessor monitors carousel rotation during a staining cycle. The display shows an error message if the rotation is not within the specified range.
	Motor Drive Error	If the display shows Motor Drive Error: Check the stainer bowl for interference: Turn the hub or carousel by hand; it should turn freely.
		Drive motor or electronic component malfunctions require servicing of internal components. Contact your dealer or ELITechGroup for assistance.
	Rotor Imbalance	If the display shows Rotor Imbalance, make certain the Cytopro rotor is balanced, or the staining carousel is seated correctly on the hub.
		See Electronic Failure later in this table.

# 7.1 Troubleshooting

Problem	Solution
The stainer fails to spray reagent during a staining cycle	To allow programmed staining of partial loads, the
and/or continues to run after the cycle should be	stainer monitors the position of the carousel as it rotates
complete.	in the bowl. In normal operation, stain is sprayed only in
	the correct position. This causes the actual cycle time to
	vary, depending on the position of the carousel at the
	beginning of the cycle. However, if the cycle continues
	for an abnormally long period, or if the bar graph and
	percentage complete icon do not change after 1 minute,
	it may indicate an electronic problem or an internal
	problem. To determine this, press <b>Stop</b> .
	If the cycle stops: this indicates a problem with the
	carousel position sensor. Consult the Aerospray Service
	Manual, or contact your dealer or ELITechGroup for
	assistance.
	If the cycle continues: this indicates an electronic
	problem (see below).
Abnormal staining on entire surface of all slides	Check the reagent level on the display and/or in the
Abriormal stamming on entire surface of an sides.	reagent hottles
	reagent bottles.
	Make sure the external reagent dip tubes are securely
	attached to each bottle (Section 2.1).
	Open the lid and verify that each reagent pump is
	primed, by pressing the corresponding prime button. The
	nozzle should immediately spray a fine mist of reagent.
	There should be no sputtering or hissing sounds
	indicating air in the reagent lines.
	Watch the external tubes for air bubbles. Air bubbles
	indicate inadequate priming or possibly an air or reagent
	leak in the system. Air in any reagent line will cause poor
	staining.
	Check nozzle performance using the Slide Pattern
	(Section 6.5) and Volume Tests (Section 6.4). If necessary,
	clean nozzle(s) using the procedures in Section 6.1.
	Verify that each reagent din tube yent hole is clear

# 7.1 Troubleshooting

Problem	Solution
Abnormal staining on entire surface of all slides (continued).	When staining a full carousel (7 or more slides) make certain you have not programmed the stainer for fewer slides. If staining a partial load, load the slides in the correct
	positions as indicated by the markings on the carousel (see Section 4.1).
Abnormal staining on entire surface of some slides, while	Make certain that all position magnets are still attached
other slides from the same carousel appear normal.	to the bottom of the carousel. Make certain you have not programmed the stainer for fewer slides than you have loaded.
	If you program the stainer for a partial load, load the slides in the correct positions as indicated by the markings on the carousel (see Section 4.1).
	Verify that each reagent pump is primed by opening the lid and pressing the corresponding prime button. The nozzle should immediately spray a fine mist of reagent. There should be no sputtering or hissing sounds to indicate the presence of air in the reagent lines (see Section 7.3).
Streaks or bands of discoloration on one or more slides.	Check the level of the Rinse (Reagent A) bottle. Check Rinse (Reagent A) spray volume according to Section 6.4.
	Check nozzle spray pattern according to the procedures in Sections 4.1 and 6.5. This type of discoloration is usually caused by debris or reagent precipitate clogging the spray nozzle orifice.
	Clean any nozzle that exhibits a poor spray pattern.
Cells are washing off slides.	Check methanol or Aerofix (Reagent D) level in bottle.
	Check Reagent D nozzle spray volume and slide pattern (see Section 6.4 and Section 6.5).

# 7.1 Troubleshooting

Problem	Solution
Cells are washing off slides (continued).	Check the methanol or Aerofix (Reagent D) hub pattern and spray volume (see Sections 4.1 and 6.5). Make certain the blood smears are completely dry and not too thick (see Section 7.2). Increase the fixation setting to High. Call ELITechGroup for information on slide quality.
Refractile artifacts are observed in erythrocytes.	Use Aerofix (SS-048 or SS-148) fixative. Refer to Section 7.2.
High levels of precipitates observed.	Discard leftover thiazin stain (Reagent B) in the used bottle when changing to a fresh bottle of stain. While transferring remaining stain saves stain, it eventually concentrates the precipitates to the point they appear on the slide.
Staining intensity is too weak. Granulation is weak.	Increase the intensity setting.
Refractile artifacts are observed in erythrocytes when using Basofix predip (SS-049P).	Mix 1 part Aerofix (SS-048) with 3 parts Basofix predip (SS-049P), or add 5 mL Aerofix concentrate (SS-148) to 500 mL Basofix predip (SS-049P).
Increased false-positives for Howell-Jolly bodies or amorphous precipitates are observed.	Disinfect reagent lines using instructions in Section 7.2. Discard leftover thiazin stain (Reagent B) in the used bottle when changing to a fresh bottle of stain. While transferring remaining stain saves stain, it eventually concentrates the precipitates to the point where they can be seen on the slide.

# 7.1 Troubleshooting

Problem	Solution
Electronic Failure	An electronic failure would appear as an obvious malfunction such as a scrambled or totally inoperative display panel.
	Transient voltages coming through the power lines may cause the stainer to "lose its place."
	1 If this occurs, switch the main power OFF for 10-20 seconds and then back ON to reset the instrument.
	2 If the problem recurs, install a computer-type surge protector to isolate the instrument.
	3 If possible, connect the stainer to a power circuit not shared by centrifuges, refrigerators, air conditioners, or other motorized equipment.
	For more obscure electronic problems, monitor the stainer through a complete staining cycle to determine if the operating sequence is correct. Do this by running the stainer while watching the display and listening to the pumps.
	Ensure that each event occurs according to the operating sequence, shown in Table 3 in Section 1.
	If the problem recurs, contact your dealer or ELITechGroup for assistance.

### 7.2 Abnormal Staining Results

#### **Smear Separation or Tearing**

Losing blood cells from the slide surface during a staining cycle can happen for several reasons:

#### **Improper Alcohol Fixation**

If the alcohol-fix phase of the cycle fails, there will be cell loss when stain is applied. Verify that the alcohol nozzle is operating properly with normal spray pattern and spray volume (Sections 6.4, 6.5). To identify the problem as a fixation failure, fix some specimen slides in methanol prior to loading into the carousel. Select a fixation setting that increases fixation (7, 8, or 9).

Wet Smears



#### Wet Smears

Loading wet blood smears into the carousel may contribute to smear tearing. Allow smears to dry for several minutes before beginning a stain cycle.

#### **Thick Smears**

Smears that are too thick can cause smear separation. If the smear has a thick "wedge" cross section, cells can be torn away from the slide surface in the thicker regions, while the thinner "monolayered" regions remain usable. Severe tearing that starts in the thick region may also extend into the monolayer.

#### **Dirty Slides**

Dirty slides are a major source of cell loss during staining. We strongly recommend that you use new, premium quality slides.

Even with premium quality slides, random loss may occur due to inadequate slide surface quality. When the stainer is functioning properly, slide quality accounts for most, if not all, cell loss problems.

#### **Red Cell Artifacts**

Refractile bodies or inclusions (seen as dark ringed objects on red cells) are thought to be caused by the presence of water during fixation. Often called "water spotting," this effect is common in Romanowsky staining. Methanol used for fixation must be anhydrous (0.5% or less water).

Methanol that is exposed to the atmosphere will absorb a considerable amount of water, particularly when the relative humidity is high. The first line of defense to avoid water spotting is to make certain the methanol used for fixing smears is free of water. If in doubt, replace it with reagent known to be anhydrous.

### 7.2 Abnormal Staining Results

#### **Red Cell Artifacts (continued)**

When the relative humidity is above 60 percent, water spotting may be seen even when using anhydrous methanol for fixation. This occurs because of moisture accumulation and condensation inside the carousel chamber. Relative humidity within the chamber will tend to build up with repeated use, leading to further problems. If water spotting occurs:

#### Use Aerofix®

Water spotting can be eliminated by using Aerofix. Aerofix is available as an additive (REF: SS-148, 135 mL bottle, enough for nine 500 mL bottles of methanol) or premixed with methanol (REF: SS-048, 500 mL bottle).

#### • Pre-fix Slides

Water spotting can usually be eliminated by pre-fixing slides in anhydrous methanol before loading into the carousel. Allow the slides to dry for 2 to 3 minutes before staining.

#### • Wipe Carousel Chamber Dry

Between cycles, leave the stainer lid open to dry out the bowl. If necessary, wipe the interior of the carousel chamber dry to reduce the relative humidity. Or, irrigate the chamber with methanol from a wash bottle.

#### False-Positive Howell-Jolly Bodies or Amorphous Precipitates

Artifactual Howell-Jolly bodies can be caused by precipitate build up from transferring the residual thiazin stain (Reagent B) to the fresh bottle when reloading reagents. Such artifacts may also indicate microbial contamination of the reagent lines and pumps.

If such artifacts are encountered, and if you suspect microbial contamination, use the following solution to disinfect the reagent lines and pumps.

Replace precipitated stain with fresh stains after flushing the B line with the disinfecting solution.

Disinfectant Solution: 10% freshly prepared dilution of household bleach (5.25% Sodium Hypochlorite).

Dilution:

- 100 mL household bleach
- + 900 mL deionized water

= 1000 mL

### 7.2 Abnormal Staining Results

Procedure: **NOTE:** Do not remove the nozzles.

- 1 Pump 150 mL of prepared solution through each affected reagent line (A, B and C). Wait 20 minutes.
- 2 Pump another 100 mL of disinfectant solution through each affected reagent line and let sit for 20 minutes.
- 3 Flush each affected reagent line with 150 mL of deionized water.



- Reprime the stainer with fresh reagents (see Section 2.2) and clean nozzles 4 according to instructions in Section 6.1 and 6.2.
- 5 Perform a Volume Test according to instructions in Section 6.4 and record on PM Chart.



#### CAUTION!

To avoid damage to the instrument, do not leave disinfectant solution in the reagent lines longer than recommended. This procedure should only be performed on an "as needed" basis.

### 7.3 Instrument Malfunction

#### **Air or Reagent Leaks**

Repriming the instrument is usually unnecessary unless a reagent bottle runs completely dry.

An air leak is usually to blame if a smooth and continuous liquid spray fails to come from the nozzles. Carefully inspect all components in the external reagent delivery lines. Look for loose connections, cracks, or breaks that might allow air to be drawn in when the pump operates. Replace any defective part or assembly.

An internal leak may cause fluid to leak from the line when the pump is not running. If an abnormal liquid spray still occurs after all the external reagent delivery line components have been verified, the instrument may require service. Contact your dealer or ELITechGroup for assistance.

A reagent line leak between the pump outlet and the nozzle will cause fluid to leak into the interior of the stainer housing and ultimately onto the counter. If you observe this, the instrument will require service. Contact your dealer or ELITechGroup for assistance.

#### WARNING!

A break or malfunction in the reagent delivery system can potentially release up to 500 mL of highly flammable anhydrous alcohol in and around the instrument. If this occurs, carefully shut off the power to the instrument and consult the SDS for information in handling alcohol spills. Do not use the instrument again until any leaks are repaired.

#### WARNING!

Electrical shock hazard—do not open this instrument or attempt internal repairs. Refer servicing to qualified service personnel. Contact your dealer or ELITechGroup Service.





### 7.3 Instrument Malfunction

#### **Reagent Level Detect System Errors**

#### **Reagent A-D Not Calibrated**

During the second part of calibration, if no bottles are detected, the display shows an error message.

Error: Calibration Failed

Calibrate again, making sure that the reagent bottles are inserted in those tray positions that have been enabled in the level detection system.

#### Level Detection (LD) Unstable

If movement was detected on bottles while calibrating/zeroing, the display shows an error message.

#### NOTE:

While zeroing or calibrating, do not bump the instrument or lab bench. Ensure that no nearby equipment vibrations can be transmitted to the stainer.

#### **Calibrating the Reagent Level Detect System**

If the Reagent Level Detect System is reporting incorrectly and zeroing (Section 2.2) does not correct the problem, calibrate the system as follows:



1

Press System Information from the Main menu.



2 Press System Setup.



3 Press Level Detect.





4 Press **Calibrate**. Follow the display prompts.

84

### 7.3 Instrument Malfunction

#### Calibrating the Reagent Level Detect System (continued)



5 Remove all reagent bottles and press Start.



REAGENT LEVEL DETECT ZERO

**NOTE:** Any vibrations or bumps to the instrument or lab bench can cause inaccuracies in zeroing or calibration.

**NOTE:** Calibration requires full, unopened (caps and seals in place) 500 mL bottles of reagent, placed in the correct tray positions (due to different densities of each reagent type).





**NOTE:** The calibration function ignores any disabled reagent line.



7

Press OK. Press Back twice to return to the Main menu.

8 Return the reagent bottles to the tray as indicated in Section 2.1 to prepare for staining.

**NOTE:** For accurate reagent level detection and calibration, dip tubes must follow their pre-formed coiled shapes.

### 7.4 Calibrating the Touchscreen



- 1 Press and hold **Standby/Ready** for 5 seconds. A calibration screen with a target appears.
- 2 Press the center of the target with a finger, stylus, or similar tool. Another target will appear in a different location.
- 3 Continue to press the center of the targets until you have pressed all the targets (five total). After the fifth target is pressed, the instrument will save the touch screen calibration and return to the Main menu.

## 7.5 Service Information

ELITechGroup's Service Department will help you resolve any questions about the operation or performance of your Aerospray Stainer/Cytocentrifuge.

Customers in the United States should contact us by telephone. Outside the U.S., our authorized dealers offer full local service and support.



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REP

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## SECTION 8 CYTOPRO[®] CYTOCENTRIFUGE

### 8.1 Cytopro Cytocentrifuge Information

#### **Functional Description**

The Cytopro Cytocentrifuge rotor allows rapid sedimentation of specimen cells onto microscope slides for staining or other purposes. Up to eight disposable/reusable sample chamber assemblies with absorbent pads and glass microscope slides can be loaded into the Cytocentrifuge rotor.

Cytocentrifuge and staining functions are independent of one another.

The Cytopro rotor reduces cell loss during collection and prevents accidental damage to the collected specimen. The rotor is sealed to control aerosol release during cytocentrifugation. See the Cytopro Rotor Applications Manual (Aerospray Models 7xx2) (RP-517) for complete information.

#### **Key Features**

Adding the Cytopro Cytocentrifuge rotor transforms the stainer into a standard cytocentrifuge with:

- Single, Dual, and Cytopro Magnum chambers
- Reusable or disposable chambers (single and dual)
- Eight slides and chambers
- User-programmable memory locations for settings (speed, acceleration rate, and time)
- Easy switching between staining and cytocentrifuge modes
- Autoclavable rotor

**NOTE:** Pressing Cyto brings up the Cytocentrifuge mode. Pressing Back returns to stain mode.

#### 🔨 WARNING!

The Cytopro rotor lid, rotor gaskets and related components are intended to be part of biosafety system as specified in international and national biosafety guidelines. They cannot be relied on as the only means of safeguarding workers and the environment when handling pathogenic microorganisms.

#### Cytopro[®] Rotor

The Cytopro Cytocentrifuge rotor is an in vitro diagnostic medical device for professional use only. It is an accessory for fixing biological cell suspensions on glass microscope slides for cytological examination.

The Cytocentrifuge rotor can be used with the following cell suspensions:

- Bronchoalveolar liquid (BAL)
- Cerebrospinal fluid (CSF)
- Urine
- Synovial fluid
- Others

# APPENDIX A Critical Reagent Components

Reagent(s)	Critical Components
SS-035A, SS-035A-EU, SS-035AG, or SS-135/149A (as diluted) Hematology Reagent A Rinse contains:	<1% Potassium Phosphate <1% Sodium Phosphate <1% Eosin <1% Benzyl Alcohol
SS-035/049B, SS-035/049B-EU, SS-035/049BG, or SS- 135/149B (as diluted) Hematology Reagent B Thiazin Stain contains:	<1% Potassium Phosphate <1% Sodium Phosphate <1% Azure B <1% Methylene Blue <1% Benzyl Alcohol <0.1% Tergitol TMN 100X
SS-035C, SS-035C-EU, SS-035CG, or SS-135/149C (as diluted) Hematology Reagent C Eosin Stain contains:	<1% Potassium Phosphate <1% Sodium Phosphate <1% Eosin <0.2% Formaldehyde <0.1% Tergitol TMN 100X
SS-048, or SS-148 (as diluted), SS-148-EU Aerofix Fixative High Humidity contains:	>95% Methyl Alcohol <4% Ethylene Glycol <2% Polyvinylpyrrolidone (PVP) <1% Azure B
SS-049A, SS-049A-EU, or SS-135/149A (as diluted) Basofix Reagent A contains:	<3% Ethyl Alcohol <3% Methyl Alcohol <1% Potassium Phosphate <1% Sodium Phosphate <1% Eosin < 0.2% Formalin
SS-049C, SS-049C-EU, or SS-135/149C (as diluted) Reagent C Basofix Eosin Stain contains:	<10% Diethylene Glycol <5% Ethyl Alcohol <5% Methyl Alcohol <1% Potassium Phosphate <1% Sodium Phosphate <1% Eosin Y
SS-049P, SS-049P-EU, or SS-149P (as diluted) Basofix Pre-dip Fixative contains:	<99% Methyl Alcohol <1% Polyvinylpyrrolidone <1% Azure B
SS-135/149A, Reagent A Rinse Reagent Concentrate contains:	<1% Potassium Phosphate <1% Sodium Phosphate <0.2% Formalin <1% Eosin
SS-135/149B, Reagent B Thiazin Stain Concentrate contains:	<10% Potassium Phosphate <10% Sodium Phosphate <2% Azure B <1% Methylene Blue

 $\triangle$  The following information identifies the critical chemicals of each reagent used in this instrument.

## APPENDIX A *Critical Reagent Components*

Reagent(s)	Critical Components
SS-135/149C, Reagent C Eosin Stain Concentrate	<10% Potassium Phosphate
contains:	<10% Sodium Phosphate
	<0.2% Formaldehyde
	<3% Eosin
SS-135S Surfactant contains:	<70% Germall II (Diazolidinyl Urea)
	<5% Tergitol TMN 100X
SS-148 or SS-148-EU, Aerofix Fixative Concentrate	55-70% Ethylene Glycol
High Humidity contains:	30-45% Polyvinylpyrrolidone (PVP)
	<1% Azure B
SS-148 or SS-148-EU, Aerofix Fixative Concentrate	40-50% Methyl Alcohol
High Humidity contains:	1-5% Oxalic Acid
SS-029C, Nozzle Cleaning Solution Concentrate	95-99% Deionized Water
contains:	1-5% Oxalic Acid
SS-133 Decontamination Solution when diluted as	<0-4% Germicidal Detergent
directed contains:	>99% Deionized Water
SS-MeOH Anhydrous Methanol contains:	≥99.5% Methyl Alcohol, Anhydrous
SS-133 Decontamination Solution Concentrate	<50% Germicidal Detergent
contains:	>50% Deionized Water

## APPENDIX B Risk and Safety Phrases

Reagents SS-035A, SS-035A-EU, and SS-035AG Reagent – A Rinse, and SS-135/149A – Rinse Reagent concentrate after dilution as directed, are associated with no Hazard and Precautionary statements. There is no Signal word.

H Statements	None
P Statements	None

Reagents SS-035/049B, SS-035/049B-EU, and SS-035/049BG – Reagent B Thiazin Stain, and SS-135/149A – Rinse Reagent concentrate after dilution as directed, are associated with no Hazard and Precautionary statements. There is no Signal word.

H Statements	None
P Statements	None

Reagents SS-035C, SS-035C-EU, and SS-035CG – Reagent C Eosin Stain, and SS-135/149A – Rinse Reagent concentrate after dilution as directed, are associated with no Hazard and Precautionary statements. The associated Signal word is Danger.

H317	May cause an allergic skin reaction
H350	May cause cancer
P261	Avoid breathing vapors, spray, mist, fumes.
P280	Wear protective gloves, protective clothing, eye protection.
P302+P352	If on skin: Wash with plenty of soap and water

SS-MeOH Aerospray Reagent-Grade Methanol is associated with the following Hazard and Precautionary statements. The associated Signal word is Danger.

H225	Highly flammable liquid and vapor
H301+H311+H331	Toxic if swallowed, in contact with skin or if inhaled
H370	Causes damage to organs
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No
	smoking
P260	Do not breath fumes, gas, vapors, mist
P280	Wear protective gloves, protective clothing
P301+310	IF SWALLOWED: Immediately call a POISON CENTER, a doctor
P311	Call a POISON CENTER, a doctor

Reagents SS-049A, SS-049A-EU– Basofix Rinse Reagent, and SS-135/149A – Rinse Reagent concentrate after dilution as directed, are associated with no Hazard and Precautionary statements. There is no Signal word.

H Statements	None
P Statements	None

SS-133 Decontamination Solution Concentrate is associated with the following Hazard and Precautionary statements: The associated Signal word is: Danger.

H290	May be corrosive to metals
H314	Causes severe skin burns and eye damage
H317	May cause an allergic skin reaction
H318	Causes serious eye damage
P261	Avoid breathing vapors, spray, mist, fume
P264	Wash hands thoroughly after handling
P280	Wear protective gloves/protective clothing/eye protection/face protection
P302+P352	IF ON SKIN: Wash with plenty of water

## APPENDIX B Risk and Safety Phrases

Reagents SS-049C and SS-049C-EU – Basofix Eosin Stain, or SS-135/149C – Eosin Stain concentrate after dilution as directed, are associated with the following Hazard and Precautionary statement. The associated Signal word is Warning.

H302	Harmful if swallowed
H371	May cause damage to organs ( if swallowed)
P260	Do not breath vapors, spray, fume, mist
P264	Wash hands thoroughly after handling
P270	Do not eat, drink, or smoke when using this product
P301+P312	IF SWALLOWED: call a POISON CENTER, a doctor if you feel unwell

Reagents SS-049P and SS-049P-EU – Basofix Pre-dip Fixative and SS-149P – Basofix Pre-dip Fixative concentrated when diluted as directed are associated with the following Hazard and Precautionary statements. The associated Signal word is Danger.

H225	Highly flammable liquid and vapor
H301+H311+H331	Toxic if swallowed, in contact with skin or if inhaled
H370	Causes damage to organs
P281	Use personal protective equipment as required
P202	Do not handle until all safety precautions have been read and understood
P233	Keep container tightly closed
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No
	smoking
P309+P311	If exposed or if you feel unwell: Call a POISON CENTER or doctor/physician
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing

Reagents SS-135/149A – Rinse Reagent Concentrate is not associated with any Hazard and Precautionary statements. There are no associated Signal words.

H statements	None	
P Statements	None	

Reagents SS-135/149B – Thiazin Stain Reagent Concentrate is not associated with any Hazard and Precautionary statements. There are no associated Signal words.

H statements	None
P Statements	None

Reagents SS-135/149C – Eosin Stain Reagent Concentrate is not associated with any Hazard and Precautionary statements. There are no associated Signal words.

H Statements	None
P Statements	None

Reagent SS-135S – Hematology Surfactant is associated with the following Hazard and Precautionary statements. The associated Signal word is Warning.

H317	May cause sensitization by skin contact
H319	May cause serious eye irritation
P261	Avoid breathing dust/fume/gas/mist/vapors/spray
P280	Wear protective gloves, eye protection
P302+P352	IF ON SKIN: Wash with plenty of water
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if
	present and easy to do. Continue rinsing

# APPENDIX B Risk and Safety Phrases

Reagents SS-148, SS-148-EU – Aerofix Additive for Methanol is associated with the following Hazard and Precautionary statements. The associated signal word is Warning.

H302	Harmful if swallowed
P264	Wash hands thoroughly after handling
P270	Do not eat, drink or smoke when using this product
P301+312	IF SWALLOWED: Call a POISON CENTER, a doctor if you feel unwell
P330	Rinse mouth
P501	Dispose of contents/container to an authorized waste collection point

SS-029 Aerospray Nozzle Cleaning Solution and SS-029C, SS-029C-EU, when diluted as instructed are associated with the following Hazard and Precautionary statements. The associated Signal word is: Danger.

H226	Flammable liquid and vapor
H301+H311+H331	Toxic if swallowed, in contact with skin or if inhaled
H314	Causes severe skin burns and eye damage
H370	Causes damage to organs (if swallowed, if inhaled)
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
P260	Do not breath vapors, spray, mist, fume
P280	Wear protective gloves, eye protection, protective clothing
P302+ P352	IF ON SKIN: Wash with plenty of water

SS-103 O-ring/Nozzle Thread Grease is associated with no Hazard and Precautionary statements. European Symbols of Danger are: None. There are no associated Signal words.

H Statements	None
P Statements	None

SS-149P, SS-149P-EU Basofix Pre-dip Fixative Concentrate when diluted as instructed is associated with no Hazard or Precautionary statements. There are no associated Signal words.

H Statements	None
P Statements	None

Reagents SS-048 – Aerofix Fixative, 500 mL, and SS-148 or SS148-EU – Aerofix Additive for methanol reagent after dilution as directed, are associated with the following Hazard and Precautionary statements. The associated Signal word is Danger.

H225	Highly flammable liquid and vapor
H301+H311+H331	Toxic if swallowed, in contact with skin or if inhaled
H370	Cause damage to organs (if swallowed)
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No
	smoking
P280	Wear protective gloves, eye protection, face protection
P301+P310	IF SWOLLOWED: immediately call a POISON CENTER, a doctor
P302+P352	IF ON SKIN: Was with plenty of water

## APPENDIX B Hazard and Precautionary Statements

SS-029C and SS-029C-EU Aerospray Nozzle Cleaning Solution is associated with the following Hazard and Precautionary statements. The associated Signal word is: Warning.

H319	Causes serious eye irritation
H314	Causes severe burns and eye damage
P280	Wear protective gloves, protective clothing, eye protection
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with
	water/shower
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if
	present and easy to do. Continue rinsing
P315	Get immediate medical advice/attention

# APPENDIX C Accessories and Supplies

Only replacement parts supplied by ELITechGroup should be used in this instrument. Use of non-approved parts may affect the performance and safety features of this product.

#### ACCESSORIES

#### **REFERENCE NUMBER**

Slide Carousel (12-Slide Capacity)	AC-188
Cytopro Cytocentrifuge Rotor	AC-160

#### STAINS AND CLEANING REAGENTS

Nozzle Cleaning Solution, 355 mL	SS-029
Nozzle Cleaning Solution Concentrate, 250 mL (Dilutes to 500 mL)	SS-029C or SS-029C-EU
Reagent A (Rinse), 500 mL	SS-035A or SS-035A-EU
Reagent B (Thiazin Stain), 500 mL	SS-035/049B or SS-035/049B-EU
Reagent C (Eosin Stain), 500 mL	SS-035C or SS-035C-EU
Reagent C (Eosin Stain), 3.785 L (1 gal)	SS-035CG
Reagent D (Methanol), 500 mL	SS-MEOH
Reagent A (Rinse), 3.785 L (1 gal)	SS-035AG
Reagent B (Thiazin Stain), 3.785 L (1 gal)	SS-035/049BG
Reagent A (Rinse) Concentrate, 135 mL (Dilutes to 4.6 L)	SS-135/149A SYSTEM
Reagent B (Thiazin Stain) Concentrate, 135 mL (Dilutes to 4.6 L)	SS-135/149B SYSTEM
Reagent C (Eosin Stain) Concentrate, 135 mL (Dilutes to 4.6 L)	SS-135/149C SYSTEM
Surfactant (used with SS-135 A, B, C)	SS-135S
Reagent D (Aerofix® Fixative High Humidity), 500 mL	SS-048
Aerofix® Additive for Reagent D (Methanol), 135 mL	SS-148 or SS-148-EU
Reagent A (Basofix [™] Rinse), 500 mL	SS-049A or SS-049A-EU
Reagent C (Basofix™ Eosin Stain), 500 mL	SS-049C or SS-049C-EU
Basofix [™] Pre-dip Fixative, 500 mL	SS-049P or SS-049P-EU
Basofix™ Pre-dip Concentrate	SS-149P
Stain Residue Solvent	SS-230 or SS-230-EU
PM Cleaning Solution	SS-266 or SS-266-EU

#### ADDITIONAL SUPPLIES

Nozzle Tool	AC-034
Nozzle Hex Wrench	AC-035
5 L Space-Saver Container w/cap (For Concentrate Reagents)	AC-038
Drain Tube, 1.8 meter (6 foot) Length	AC-041
500 mL bottle with cap (pack of 5 bottles)	AC-043-05
Nozzle Orifice Cleaning Wire	AC-059
Reagent Pump Priming Tool	AC-069
Aerospray/Cytopro Safety Shield	AC-110
10 L Waste Container (without level detect)	AC-170
1D Barcode Scanner	AC-181
10 L Waste Container (with level detect)	AC-182
Nozzle Maintenance Kit	AC-184
2D Barcode Scanner	AC-185
Decontamination Solution Concentrate	SS-133
O-Ring/Nozzle Thread Grease (3 grams)	SS-103
Preventive Maintenance Chart, pad of 24 sheets	SS-265
Aerospray Hematology Stat (Model 7122) Applications Manual	RP-460
Paper Test Slides	RP-500

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