

CYTOPRO[®]
CYTOCENTRIFUGE ROTOR

Model AC-160

Applications Manual
For Aerospray[®] Models 7xx2

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REF

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1.1 Cytopro Cytocentrifuge Rotor Overview

Using this Manual

This manual provides instructions to install, operate, and maintain the Cytopro Cytocentrifuge Rotor.

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 to safety regulations for electrical control, regulating, and laboratory devices. 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 levels of warnings 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!

The Cytopro rotor lid, rotor gaskets and related components are intended to be part of a 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.

SECTION 1 INTRODUCTION

1.1 Cytopro Cytocentrifuge Rotor Overview

WARNING!

If power is lost during cytocentrifugation, the lid remains locked until power is restored. Do not attempt to open the lid while power is off.

CAUTION:

Use only spare parts supplied or specified by Elitech Group. Using non-approved parts may affect the performance and safety features of the instrument. Using this equipment in a manner not specified by Elitech Group may impair the protection provided by the equipment. If in doubt, contact your Elitech Group representative.

Functional Description

The Cytopro Cytocentrifuge rotor is an accessory to the Aerospray line of automatic slide stainers. The 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.

Key Features

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

- Single, Dual, and Cytopro Magnum chambers
- Reusable or disposable, chambers (single and dual)
- Capacity of eight slides and chambers
- User-programmable 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.

Intended Use

The Cytopro Cytocentrifuge rotor is an in vitro diagnostic medical device for fixing biological cell suspensions on glass microscope slides for cytological examination. It is an accessory for use with any Elitech Group Aerospray Slide Stainer/Cytocentrifuge. This manual pertains only to the Series 2 stainer/cytocentrifuge models. The rotor can be used with the following cell suspensions:

- Bronchoalveolar liquid (BAL)
- Cerebrospinal fluid (CSF)
- Urine
- Synovial fluid
- Many More

1.1 Cytopro Cytocentrifuge Rotor Overview

Table 1: Cytopro Rotor Specifications

Category	Characteristics
Sample Well Capacity*	Single: 0.5 mL max Dual: 2 x 0.3 mL Cytopro Magnum: 6 mL
Cell Deposit Area	Single = 38.5 mm ² (7 mm diameter) Dual = 77 mm ² (2 x 7 mm diameter) Cytopro Magnum = 315 mm ²
Rotor Capacity	Up to 8 slides and Cytopro chambers
Rotor Dimensions (Diameter x Height, including lid)	22.6 x 6.2 cm (8.9 x 2.4 inches)
Rotor Weight (including lid)	1.1 kg (2.5 lb)
Rotor Speed Range	100 to 2000 rpm
Acceleration Rate	Low, Medium, High
Cycle Time	1 to 99 min.

*Do not overfill cytocentrifuge chambers. See Section 3.1 or the Cytopro Methods Manual for detailed instructions and warnings.

SECTION 1 INTRODUCTION

1.1 Cytopro Cyto centrifuge Rotor Overview

Table 2: Sample Treatment Options

The chart below suggests procedures for various fluids. Refer to the Methods Manual for more detailed information. Methods currently used in other cyto centrifuges will often work in the Cytopro, if the maximum volume of fluid and the run time is adjusted appropriately (see chart).

	Sample Prep	Cytopad Type	Sample Vol (mL)*	Loading Position	Prewet (mL)	In Situ Fix (mL)	Speed (rpm)	Time (min)**	Acceleration
Hematology									
CSF	e, f	Tan	0.2	Well	0-0.1	N/A	1000	3-5	High
Urine	a, d, e, f	Tan	0.2	Well	0-0.1	N/A	1000	3-5	High
Synovial	c, d, e, f	White	0.2	Well	0-0.1	N/A	1000	3-5	High
Sputum	c, e	White	0.2	Well	0-0.1	N/A	1000	3-5	High
Aspirates	a, c, d, e, f	Tan/White	0.2	Well	0-0.1	N/A	1000	3-5	High
Washes	a, d, e, f	Tan/White	0.2	Well	0-0.1	N/A	1000	3-5	High
Gram									
CSF	e, f	Tan	0.2	Well	0-0.1	N/A	1000	3-5	High
Urine	a, d, e, f	Tan	0.2	Well	0-0.1	N/A	1000	3-5	High
Synovial	c, d, e, f	White	0.2	Well	0-0.1	N/A	1000	3-5	High
Sputum	c, e, f	White	0.2	Well	0-0.1	N/A	1000	3-5	High
Aspirates	a, c, d, e, f	Tan/White	0.2	Well	0-0.1	N/A	1000	3-5	High
Washes	a, d, e, f	Tan/White	0.2	Well	0-0.1	N/A	1000	3-5	High
Cytology									
CSF	b, e, f, g	Tan	0.2	Well	0-0.1	Optional	1000	3-5	High
Urine	a, d, e, f, g	Tan	0.2	Well	0-0.1	Optional	1000	3-5	High
Synovial	b, c, d, e, f, g	Tan	0.2	Well	0-0.1	Optional	1000	3-5	High
Aspirates	a, b, c, d, e, f, g	Tan/White	0.2	Well	0-0.1	Optional	1000	3-5	High
Washes	a, b, d, e, f, g	Tan/White	0.2	Well	0-0.1	Optional	1000	3-5	High
Pre-Fixed	d, e, f, g	Tan	0.2	Well	0-0.1	Optional	1000	3-5	High
Cytopro Magnum	a, b, c, d, e, f, g	N/A	2-6	Well	N/A	N/A	2000	3-10	High

LEGEND

Sample Preparation

- a. Treat bloody samples.
 - 1. Collect in anticoagulant.
 - 2. Lyse red cells.
- b. If processing will be delayed, preserve fragile cells.
- c. Treat viscous samples if necessary.
- d. Remove precipitates or debris when necessary.
- e. Adjust cell count.
 - Large (epithelial) 8,000 - 12,000 per 0.2 mL sample
 - Medium (urothelial) 16,000 - 24,000 per 0.2 mL sample
 - Small (leukocytes) 50,000 - 125,000 per 0.2 mL sample
 - 1. Concentrate low cellularity samples by precentrifugation.
 - 2. Dilute high cellularity samples with balanced saline plus 2 to 4 percent bovine serum albumin (BSA).
- f. Adjust cell environment where necessary.
- g. Use treated slides to increase cell adhesion.

Cytopad: † Thin samples = slow (tan).

Thick samples = fast (white).

Sample: 0.1 to 0.3 mL optimal. Samples less than 0.1 mL yield increased volume cell loss (0.5 mL max -total fluid-single chamber). 0.6 mL max total fluid for dual sample chamber (2 x 0.3 mL).

Cytopro Magnum: 2 to 6 mL optimal. Dilute smaller samples with diluent before cyto centrifugation to obtain at least 2 mL.

Prewetting: † Load up to 200 µL balanced saline in tunnel, (sample in well).

In Situ Fix: † Load up to 200 µL of sample in tunnel, 50 to 100 µL of saccomanno type fixative in sample well.

Speed: High speed for small cells, low for large and/or fragile cells.

Time: Samples with debris, viscosity or high cellularity will require extended run times.

* 1 drop of distilled water equals 20 to 40 µL depending on pipette used. Other fluids may fall outside this range.

















** For samples in balanced saline, increase time up to 2x for BSA samples and native body fluids.

† Standard volume chambers only.

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INTRODUCTION

1.1 Cytopro Cyto centrifuge Rotor Overview

Table 3: Explanation of Symbols

	Biological Hazards (Biological Risks)
	Alternating Current (AC)
	Power ON
	Power OFF
	Caution, Consult Accompanying Documents (Attention, see instructions for use)
	Biological Hazard Symbol
	Manufacturer's Representative in Europe
	Manufactured by
	Waste Electrical and Electronic Equipment (WEEE)
	CE Mark, Product meets the essential requirements designated in Annex I of the In Vitro Device Directive (IVDD) 98/79/EC
	In Vitro Diagnostic Medical Device
	Consult Instructions for Use
	Environment Friendly Use Period
	Catalog Number (Model Number)
	General Symbol for Recovery, Recyclable
	Batch Code

SECTION 1
INTRODUCTION

1.1 Cytopro Cyto centrifuge Rotor Overview

The Cytopro Rotor

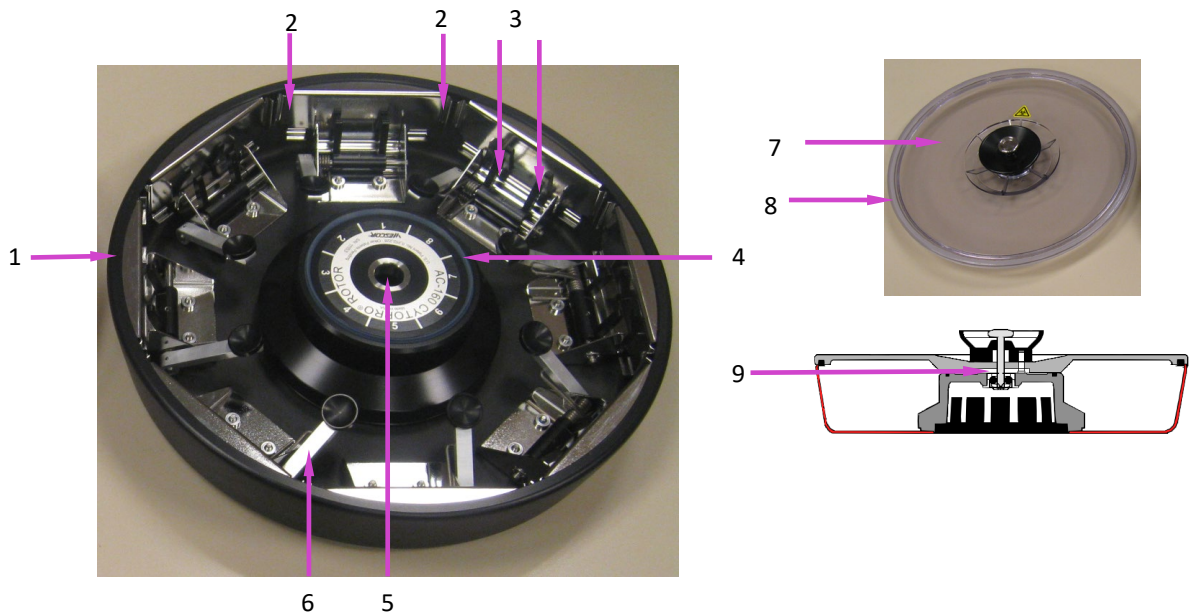
The Cytopro rotor holds up to eight sample chamber assemblies, and microscope slides. The rotor operates on the drive hub of the stainer. The self-sealing, autoclavable rotor is easy to load in a biological safety cabinet. The lid seals airtight to contain biological hazards. The low-profile rotor allows easy access during loading. While in the rotor, slide labels are always visible for easy sample identification.

Sample Chamber Holder

Each sample chamber holder uses spring compression to maintain the seal between chamber and slide. This helps control the rate of absorption in the standard chambers.

Depress the release lever to load and unload chamber assemblies and slides. This lever action cleanly retracts the chamber away from the slide; slides are easily removed without smearing the cells.

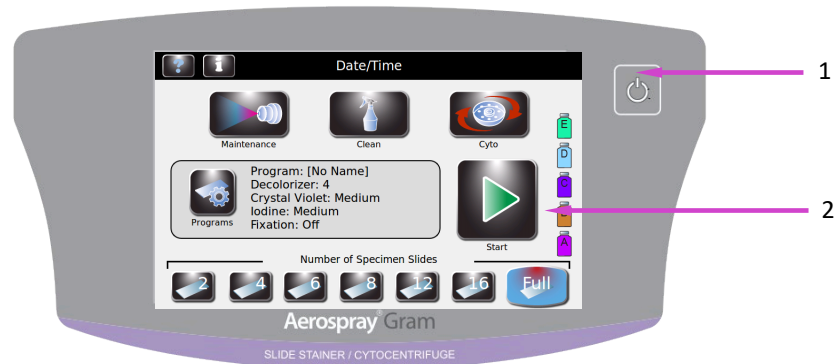
Figure 1: The Cytopro Rotor and Lid



- 1 – Cytopro Cyto centrifuge Rotor
- 2 – Slide Bracket (2 in each position)
- 3 – Chamber Lever Fingers (2 in each position)
- 4 – Hub Seal
- 5 – Locking Pin Receptacle
- 6 – Chamber/Slide Release Lever
- 7 – Rotor Lid with Locking Lid Latch
- 8 – Bowl Seal
- 9 – Cytopro Rotor with Locking Lid

1.1 Cytopro Cyto centrifuge Rotor Overview

Figure 2: Front Panel and Touchscreen (Gram Stainer shown)



- 1 – Standby/Ready Button
- 2 – Touch Screen

The front panel features an interactive touchscreen display. Refer to Touchscreen and User Interface (Section 1.2, Table 4) for more information.

Single Sample Chamber

The reusable single chamber features a dual-port sample loading port system that places a 38.5 mm² (7 mm diameter) spot on the microscope slide.

Tunnel Port

The tunnel port allows up to 200 µL of fluid to be placed directly into the chamber tunnel. This allows flexibility in sample treatment, including in situ fixation and pad prewetting.

Sample Port

Load samples into the sample port for most applications. The sample well holds up to 0.5 mL of fluid. Use a pipette to load sample fluid through the open ports or through air vents in the chamber cap. See Section 3.1 for more information.

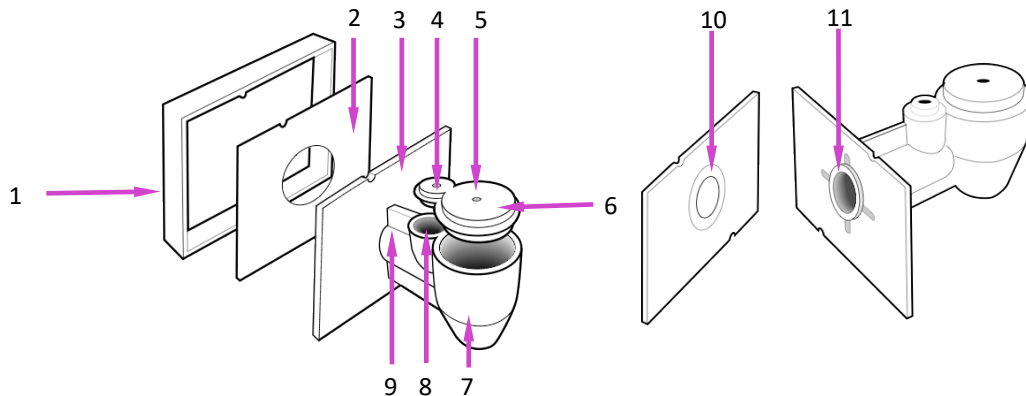
Chamber Pressure Ring

The raised ring at the end of the chamber tunnel seals the Cytopad against the glass slide to restrict fluid flow during cyto centrifugation.

SECTION 1 INTRODUCTION

1.1 Cytopro Cyto centrifuge Rotor Overview

Figure 3: Single Chamber Assembly



- 1 – Chamber Frame
- 2 – Cytopad
- 3 – Chamber Base
- 4 – Tunnel Port Cap Vent
- 5 – Sample Well Cap Vent
- 6 – Cap
- 7 – Sample Well
- 8 – Tunnel Port
- 9 – Chamber Tunnel
- 10 – Flow Control Ring
- 11 – Chamber Pressure Ring

Dual Sample Chambers

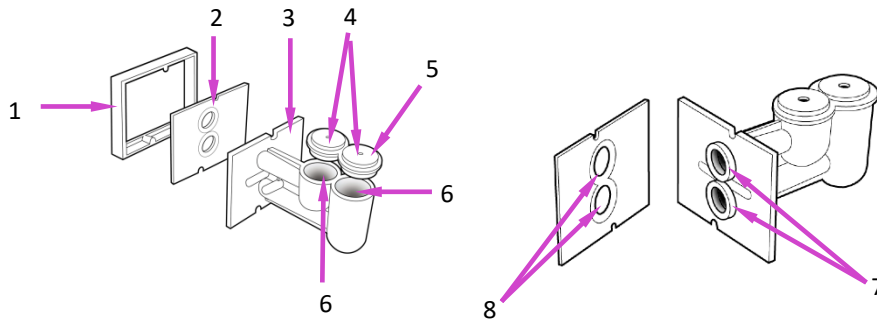
Dual chambers are designed to operate the same way as single chambers. The reusable dual sample chambers allow you to place two 38.5 mm² (7 mm diameter each) spots of specimen on the same microscope slide.

Dual Chamber Wells

Each sample well holds up to 0.3 mL of fluid (a total of 0.6 mL per slide). Use a pipette to load sample fluid through the open ports or through air vents in the chamber cap. See Section 3.1 for more information.

1.1 Cytopro Cyto centrifuge Rotor Overview

Figure 4: Dual Sample Chamber



- 1 – Chamber Frame
- 2 – Cytopad
- 3 – Chamber Base
- 4 – Cap Vents
- 5 – Cap
- 6 – Sample Wells
- 7 – Chamber Pressure Rings
- 8 – Flow Control Rings

Cytopro Magnum™ Sample Chambers

The disposable, non-reusable Cytopro Magnum sample chamber allows you to place a rectangular 315 mm² spot of specimen on a single microscope slide.

Sample Well

The sample well holds up to 6.0 mL of fluid. The sample can be either poured into the sample well or pipetted through the open port in the sample well cap. Make sure the chamber cap is properly secured prior to running the sample. Failure to do so may allow fluid to leak into the rotor.

Chamber Sealing Gasket

The gasket at the end of the sedimentation chamber seals the Cytopro Magnum against the glass slide to prevent fluid from leaking during cyto centrifugation.

Fluid Absorption Chambers

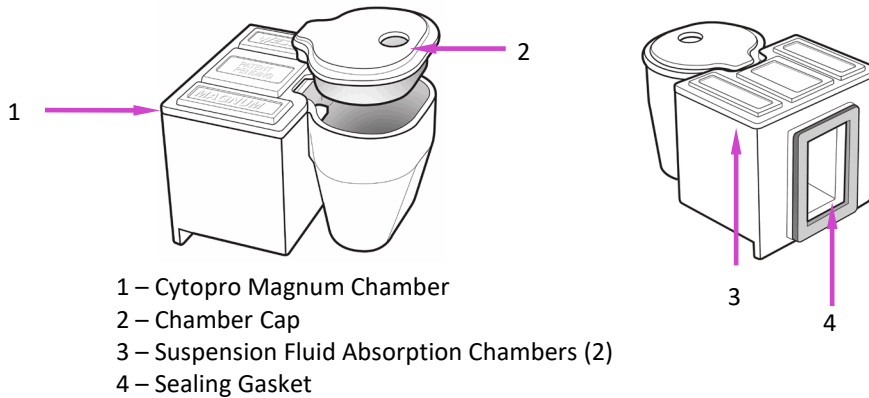
The two fluid absorption chambers are filled with an absorbent media that absorbs the residual sample fluid after the cells are removed through cyto centrifugation.

NOTE: The absorbent media may turn yellow with age and light exposure. This color change does not affect the absorption properties of the media and the chambers can still be used with confidence.

SECTION 1
INTRODUCTION

1.1 Cytopro Cyto centrifuge Rotor Overview

Figure 5: Cytopro Magnum Chamber



Cytopad Absorption Pads

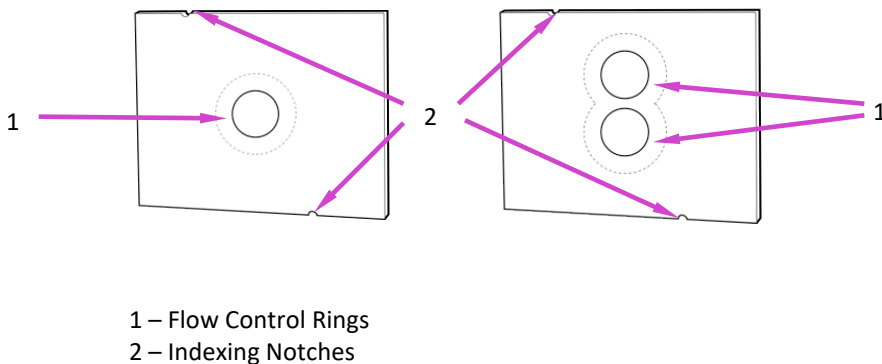
Cytopads (standard chambers only) absorb suspension fluid and allow sample cells to sediment onto the microscope slide. Cytopads feature compressed flow-control rings for controlled absorption of suspension fluids.

Cytopads are available in two absorption rates. The slow (tan) pad is for rapidly absorbed fluids of low viscosity, low cellularity, or low turbidity. Use the fast (white) pad for more viscous cell suspensions.

NOTE: Tan pads may vary in color from lot to lot and even from pad to pad. These color differences do not change the performance of the pad. The tan color is used to differentiate these pads from the white pads.

Cytopads are held securely between the chamber and the chamber frame for dependable performance.

Figure 6: Cytopad Absorption Pads

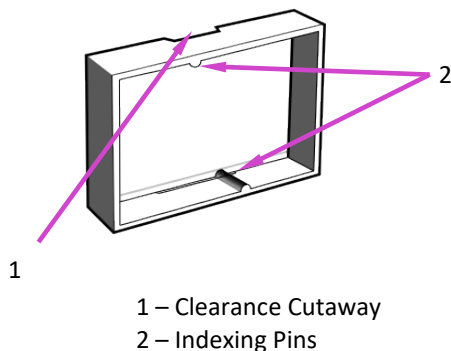


1.1 Cytopro Cytocentrifuge Rotor Overview

Chamber Frame

Chamber frames accept either single or dual replacement pads and have a cutaway to prevent cells from being smeared as the chamber assembly is removed. Indexing pins on the frame ensure correct Cytopad alignment. Cytopads come pre-attached to chambers or in boxes of 100 for attaching to reused chambers.

Figure 7: Chamber Frame

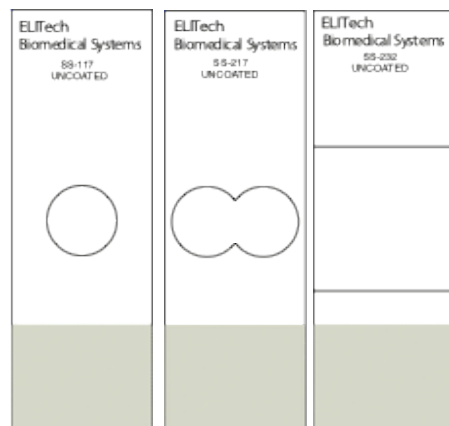


Microscope Slides

Use standard (25 x 75 mm) glass microscope slides. For cytology specimens, use coated slides to reduce cell loss during wet fixation and staining.

Elitech Group offers specially designed target slides for the Cytopro system. These slides are available in uncoated (single SS-117; dual SS-217; Cytopro Magnum SS-232) and Poly-L-Lysine coated (single SS-118; dual SS-218; Cytopro Magnum SS-233).

Figure 8: Microscope Slides












SECTION 1 INTRODUCTION

1.2 Touchscreen and User Interface








Users control all instrument functions from the interactive touchscreen display. Only those functions that pertain to cyto centrifugation are discussed in this manual. See the Aerospray Stainer User's manual for more information.

Table 4: Front Panel/Main Screen Function Keys

Button	Name	Description
	Standby/Ready	With instrument power ON: Blue = Ready Amber = Standby Pressing Standby places instrument into standby mode and runs a Clean cycle The Standby/Ready button also accesses the touchscreen calibration function. Refer to Aerospray Stainer (Model 7xx2) Manual.
	Cyto	Enters the Cyto centrifuge mode
	System Information	Shows the system information, including serial number and software version. Allows access to the System Setup features. Refer to System Setup Menu, (Section 2).
	Help	Opens the software Help file
	Start/Load Slides	Begins a cycle in Stain or Cyto centrifuge mode. The Start button is inactive until a program is created. Refer to Creating a Stain Program (Section 2) With Slide Tracking enabled, opens the Scan and Load Slides menu, (Section 2)
	Back	Returns to the previous menu
	Stop	Aborts any operation
	OK	Indicates completion of current task
	System Setup	Allows users to modify the software settings. See System Setup Menu, (Section 2)

1.2 Touchscreen and User Interface

Table 4: Front Panel/Main Screen Function Keys (continued)

Button	Name	Description
	Cyto Programs	Allows users to create, edit, and delete cytocentrifuge programs
	QC/Maintenance Tracking	Enables slide tracking, preventive maintenance tracking, and reagent tracking
	System Log	Allows users to control logging functions
	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.
	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.

SECTION 2 CONTROLLING AND CUSTOMIZING CYTOCENTRIFUGE FUNCTIONS

2.1 System Setup Menu

Many software settings can be controlled from the System Setup menu. Only functions related to cyto centrifugation are explained in this manual. Refer to the Aerospray Stainer User manual for complete information.

Accessing the System Setup Menu



- 1 Press **System Information**.



- 2 Press **System Setup**.



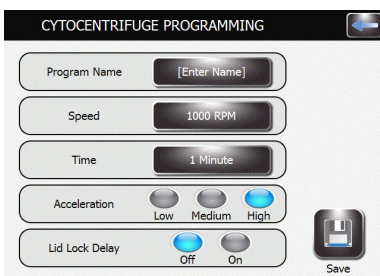
Creating a Cyto centrifuge Program



- 1 From the System Setup menu, press **Cyto Programs**.



- 2 Press **Add**.



- 3 Enter a program name in the Program Name field.

- 4 Enter the program speed setting in rpm.

- 5 Enter the program time.

- 6 Select the acceleration speed (LOW, MED, HIGH).

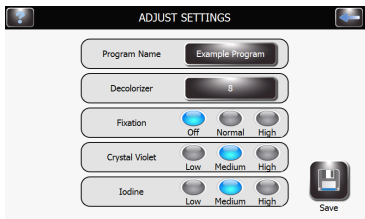
- 7 Choose ON or OFF for the lid lock delay.

- 8 Press **Save**.

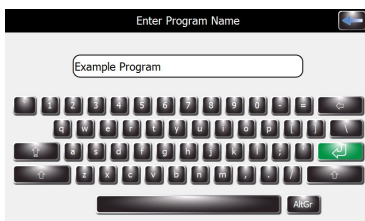
SECTION 2 CONTROLLING AND CUSTOMIZING CYTOCENTRIFUGE FUNCTIONS

2.1 System Setup Menu

Editing a Cytocentrifuge Program

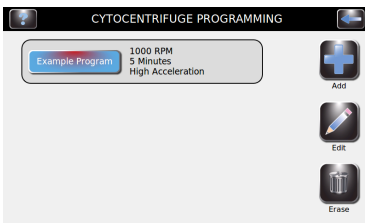


- 1 From System Setup, press **Cyto Programs**.
- 2 Select the program to be modified.
- 3 Press **Edit**.
- 4 Adjust the settings as desired.
- 5 Press **Save**.



Changing the Program Name:

- 1 From Adjust Settings menu, select **Program Name**.
- 2 Press **Edit**.
- 3 Enter the program name on the keypad.
- 4 Press **Enter**.



Deleting a Cytocentrifuge Program

- 1 From the System Information menu, press **System Setup**.
- 3 Press **Cyto Programs**.
- 4 Select the program to be deleted.
- 5 Select **Erase**.

SECTION 2 CONTROLLING AND CUSTOMIZING CYTOCENTRIFUGE FUNCTIONS

2.2 Recording Specimen and Slide Information

Scanning Slides with the Barcode Reader



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



- 2 Select **Enable Cyto Slide Tracking**.

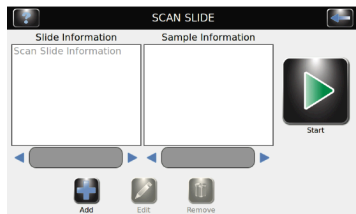
NOTE: Selecting *Enable Cyto Slide Tracking* changes the *Start* button on the *Main* menu to "Load Slides."



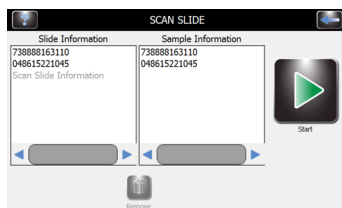
- 3 Press **Back** twice to return to the Main menu.



- 4 Press **Load Slides** on the Main menu. The Scan Slide menu will appear.



- 5 Scan the barcode of each slide and sample in the batch using the ID barcode accompanying the specimen. Load the rotor according to instructions in Section 3.



- 6 Verify that each barcode appears on the Scan and Load Slides menu.



- 7 When you have completed preparations, (Section 3) press **Start**.

SECTION 2 CONTROLLING AND CUSTOMIZING CYTOCENTRIFUGE FUNCTIONS

2.2 Recording Specimen and Slide Information

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 Press **Add** to reveal the keypad.



3 Enter slide information (maximum of 24 characters) and/or sample information and press **Return**.



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

5 Load slides and run cytocentrifuge cycle as shown in Section 3.

SECTION 3 OPERATING THE CYTOCENTRIFUGE

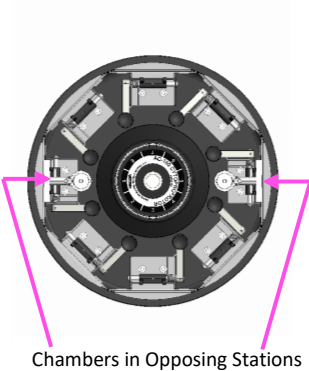
3.1 Running a Cytocentrifuge Cycle

Suggested Cytocentrifugation Protocol

- If enabled, scan or enter cyto slide and/or sample information.
- Prepare and load slides into the rotor.
- Load chambers into the rotor.
- Load samples into the chambers.
- Place loaded rotor onto the instrument hub and close the lid.
- Select or verify desired cytocentrifuge program.
- Perform a cytocentrifuge cycle.
- Remove rotor from the instrument.
- Check for complete absorption of suspension fluids.
- Remove chambers for cleaning or disposal.
- Remove slides for further processing.

Balancing the Rotor

The Cytopro rotor contains eight sample chamber stations. When preparing fewer than eight samples, balance the rotor by placing chambers and slides in opposing stations (using an empty chamber and slide if necessary). This prevents a rotor imbalance from interrupting the centrifuge process.



When using Cytopro Magnum chambers, the carousel must be balanced with another Cytopro Magnum chamber and slide that has approximately the same sample volume, for example: a 6 mL sample should be balanced with a sample of at least 5 to 6 mL. An empty Cytopro Magnum chamber and slide will not adequately balance the rotor.

NOTE: Property stickers or tags can also potentially imbalance the rotor. Institutional identification marks should be virtually weightless if placed on the rotor.

NOTE: A warning will sound during the cycle if the rotor is unbalanced.

Preparing and Loading Slides



- 1 Clean microscope slides provide maximum cell adherence. Use pre-cleaned, premium-grade slides.
- 2 For better cell adherence, pretreat slides or use custom pretreated slides.

NOTE: Even clean slides show improved cell adherence after pre-treating with chemical adherents such as Poly-L-Lysine, or amino silane.

SECTION 3 OPERATING THE CYTOCENTRIFUGE

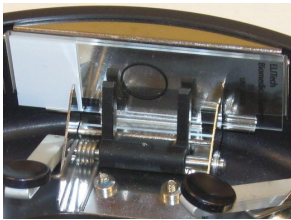
3.1 Running a Cytocentrifuge Cycle

Preparing and Loading Slides (continued)



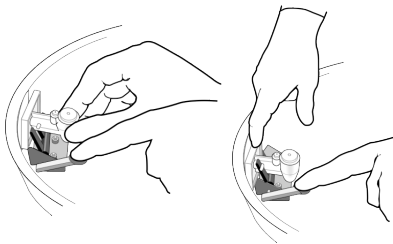
- 3 If Slide Tracking is enabled, press **Load Slides**.
 - If using the barcode reader, scan each specimen slide and sample barcode before loading it into the carousel. Slide tracking must be enabled from the System Setup menu. See Recording Specimen and Slide Information in Section 2.2.
 - If entering slide information manually, follow the instructions in Section 2.2.
- 4 Place each slide into a slide bracket with the labeled side facing into the rotor. Slides can be loaded without depressing release levers.

Loading Chambers into the Rotor



Single or Dual Chambers:

- 1 Make sure each slide is correctly loaded into a slide bracket with the labeled side facing into the rotor.
- 2 Use the chart in Section 1.1 to select a chamber with the desired type of Cytopad (fast = white, slow = tan).



- 3 Depress the release lever and insert a chamber assembly.
- 4 Release the lever while gently pressing down on the top of the chamber frame to ensure the chamber is squarely seated.

Cytopro Magnum Chambers:

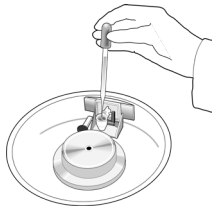


- 1 Make sure each slide is correctly loaded into a slide bracket with the labeled side facing into the rotor. Slides can be loaded without depressing release levers.
- 2 Depress the release lever and insert a Magnum chamber over the prongs of the two chamber lever fingers.
- 3 To ensure the chamber is squarely seated, release the lever while gently pressing down on the top of the chamber.

SECTION 3 OPERATING THE CYTOCENTRIFUGE

3.1 Running a Cytocentrifuge Cycle

Loading Samples



- 1 Load sample and prewetting fluids through cap vents, or directly into the ports before the cap is placed on the chamber. Use the chamber caps to minimize contamination and accidents. Chamber caps are mandatory for the Cytopro Magnum.

The vent holes in the standard volume chamber caps accept either glass Pasteur pipette tips or 200 microliter automatic pipette tips. Cytopro Magnum chamber caps accept up to 10 mL automatic pipette tips. Refer to Sample Treatment Options (Table 2 in Section 1) or the Cytopro Methods Manual (RP-451) for sample treatment considerations.

WARNING!

Always load chambers in a biological safety hood, using appropriate hand and eye protection.

WARNING!

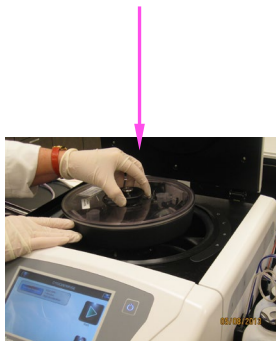
Do not exceed listed maximum sample volume: (0.5 mL for the single chamber, 0.3 mL in each well of the dual chamber, 0.6 mL total, or 6 mL for the Cytopro Magnum chamber).

- 2 Place the lid on the rotor by lifting the locking pin as you place the center pin into the rotor lid receptacle. Press down on the locking pin until it locks.

NOTE: Locking and unlocking the lid is easier if you press down near the center of the lid with one hand while operating the locking pin with the other.

- 3 Carefully transfer the rotor to the instrument. Avoid bumping or tilting the rotor.

Performing a Cytocentrifuge Cycle



- 1 Press **Cyto** to reveal the Cytocentrifuge menu.
- 2 Select the desired cytocentrifuge program, or program the desired settings using the instructions in Section 2.1 (Creating a Cytocentrifuge Program).
 - If you have not enabled slide and specimen information entry, proceed to step 3.
 - If you have enabled slide and specimen information entry, press **Load Slides**.
 - Scan or enter the slide and sample information.
 - Load slides and specimens and replace the rotor lid as instructed in this section.
- 3 Insert rotor loaded with specimens and slides and close the instrument lid.
- 4 Press **Start**.



SECTION 3 OPERATING THE CYTOCENTRIFUGE

3.1 Running a Cytocentrifuge Cycle

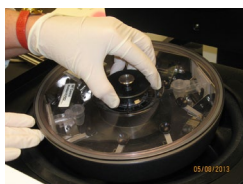
The display shows the progress of the program, and a signal tone (if enabled) indicates the end of the cycle.



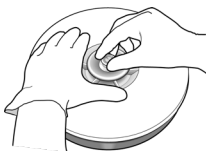
NOTE: Use the emergency Stop button when required, for example, if there is abnormal vibration or noise. This will abort the cycle.

Unloading the Rotor

Note: When slides are removed from the rotor, cells rapidly begin to dry. Transporting exposed slides subjects them to air flow and greatly accelerates drying. Slides to be wet-fixed for Papanicolaou staining should be processed near the rotor or transported in the rotor to the treatment site. Fix slides as quickly as possible after removing from the rotor. In situ fixation will prevent these problems.

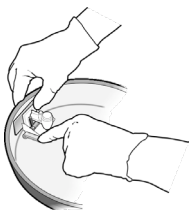


- 1 Open the stainer lid and transfer the rotor to a biological safety hood.
- 2 Remove the rotor lid by pressing with one hand on the center of the rotor lid while lifting the locking pin with the other hand.



CAUTION!

Never attempt to release the lid by holding the lid knob and shaking the rotor with the locking pin released. This can allow the rotor to drop and damage the microscope slides and rotor.



- 3 Check single or dual chambers for residual suspension fluid by looking for fluid in the chamber tunnel. If the fluid is not completely absorbed, rerun the sample. If fluid flow is stopped, try the following:
 - Grip the rotor as shown.
 - Press the upper right section of the chamber base with your right thumb while slightly pressing the release lever with your other hand.
 - Hold for a few seconds until residual fluid (observable in the chamber tunnel) is absorbed into the Cytopad.

CAUTION!

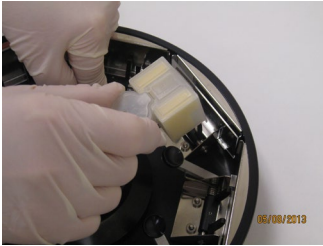
Removing fluid by these methods causes some cell loss. The remaining cells may not be completely flattened against the slide.

SECTION 3 OPERATING THE CYTOCENTRIFUGE

3.1 Running a Cytocentrifuge Cycle

Unloading the Rotor (continued)

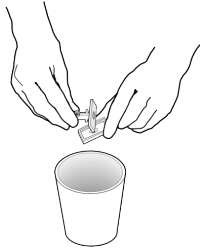
Cytopro Magnum chambers must remain in the rotor and in contact with the slide for 45 seconds after cytocentrifugation has stopped. This allows the fluid to be completely absorbed by the absorbent media. Use the lid unlock delay function to ensure the 45-second delay is completed before opening the lid. See the Cytopro Methods Manual (RP-451) for additional information.



- 4 Completely depress the release lever and remove the chambers.
- 5 Discard used chambers and Cytopads in a biohazard container or according to local regulations and prudent laboratory practices.
- 6 Remove the slides. Quickly wet fix or air dry depending on desired staining to follow. (Wet fix for Papanicolaou, dry fix for hematology and Gram stains.)

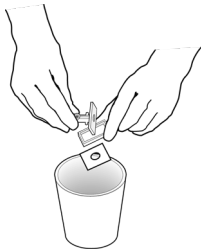
Note: If you intend to reuse standard volume chambers, you must thoroughly clean and decontaminate them using the methods described in Section 4.2. Cytopro Magnum chambers must be discarded after use.

Separating Chambers from Cytopads



The following information applies only to the reusable standard volume chambers. Cytopro Magnum chambers are single use only and must be discarded after each use.

Before cleaning, chambers must be separated from the used Cytopads, which are not reusable. To remove Cytopads:



- 1 Remove the frame from the chamber.
- 2 Use the sample chamber base to push the used Cytopad out of the frame and into a biohazard container for disposal.
- 3 Place chambers and frames immediately into a detergent or disinfectant to prevent cells from drying onto chamber surfaces. Sterilize chambers according to instructions in Section 4.2.

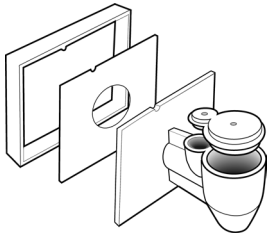
SECTION 3 OPERATING THE CYTOCENTRIFUGE

3.1 Running a Cyto centrifuge Cycle

Attaching Cytopads to Chambers

To reuse a chamber, attach a new Cytopad after the chamber is cleaned, disinfected, and thoroughly dried.

To assemble Cytopads with sample chambers:



- 1 Place a Cytopad inside a chamber frame, using the indexing pins for correct positioning.
- 2 Snap the frame over the chamber base. Be sure the sample chamber base is securely seated in the frame.

WARNING!

Dispose of all used chambers or Cytopads according to local regulations and prudent laboratory practices.

SECTION 4 PREVENTIVE MAINTENANCE AND SAFETY

4.1 Routine and Preventive Maintenance

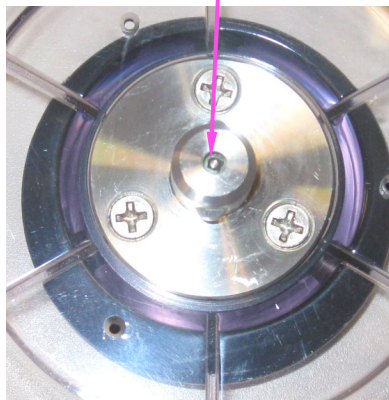
The Cytopro is designed to be simple to use and care for with few user-serviceable components. Maintenance is primarily keeping the instrument and rotor clean (see Section 4.2). Other preventive measures are listed below:

- **Check Seals**
Hub and rotor seals must be inspected frequently for cracks or signs of deterioration. Replace seals yearly, or whenever they show any signs of wear.

- **Lubricate Lid Latch Mechanism**
Treat the lid latch mechanism with the grease from the Cytopro Rotor Maintenance Kit (SS-060) after autoclaving or if it is difficult to manipulate as follows:
 - 1 Turn the lid upside down.
 - 2 Place a small amount of grease directly into the lid locking pin receptacle
 - 3 Work the locking pin back and forth a number of times to allow grease to penetrate the mechanism.
 - 4 Check for and wipe off any excess grease at the mouth of the lid locking pin hole.

Figure 9: Lubricating the Carousel Locking Pin

SS-060 Grease



SECTION 4 PREVENTIVE MAINTENANCE AND SAFETY

4.2 Cleaning and Decontamination Procedures

The rotor and chambers are designed to reduce the risk of fluid escaping into the rotor interior during cyto centrifugation. However, the chambers do not fully eliminate biohazard contamination risks. Introducing samples into the chambers, insecurely placed caps, improper placement of chambers, and/or exceeding the maximum volume can lead to contamination of the rotor interior.

The rotor seal is designed to prevent any fluid that may have contaminated the rotor interior from escaping into the environment. Check the rotor seals routinely for obvious cracks and tears. The rotor should be sterilized periodically, and whenever you observe or suspect a spill.

The nature of samples being run in the rotor should be considered when determining the frequency of rotor sterilization. In case of biohazard contamination, the user is responsible for performing all appropriate decontamination procedures.

CAUTION!

Never use acetone or other ketones, benzene, toluene, or other solvents to clean the instrument or rotor. Serious damage can result from using these substances.

CAUTION!

Contact Elitech Group before using any decontamination methods or cleaning agents other than those shown in this manual. Other methods can damage the rotor or instrument and void the warranty.



WARNING!

The rotor should always be opened and closed in a biological safety hood. Always wear proper eye and hand protection when handling samples and unloading the chambers from the rotor.

NOTE: *Sample spillage may be caused by cyto centrifugation without chamber caps in place and/or by over-filling the chamber. Pad leakage in standard volume chambers may be caused by running large sample volumes or alcoholic solutions at high rotor speeds. To avoid such problems, follow the recommendations in Table 2: Sample Treatment Options (Section 1.1). For further information contact Elitech Group.*

SECTION 4 PREVENTIVE MAINTENANCE AND SAFETY

4.2 Cleaning and Decontamination Procedures

Chemically Disinfecting the Rotor

To chemically disinfect for Human Immunodeficiency Virus (HIV) or Mycobacterium tuberculosis:

- 1 Spray with diluted (1/256 x 30 mL/gallon of water) Vesphene II SE* or some other intermediate level disinfecting detergent and soak for at least 20 minutes.
- 2 Remove detergent by thoroughly rinsing with tap water.
- 3 If sporicidal sterilization is required, follow the above disinfectant with 2% alkaline activated glutaraldehyde for 10 hours.
- 4 Completely remove all chemical solutions with water before reusing the rotor.
- 5 Wipe the rotor dry.

* Vesphene II SE is a product of STERIS Corporation.

Note: This procedure is not considered effective against Creutzfeldt-Jakob Disease virus (CJD).

Autoclaving the Rotor

- The best sterilization procedure is to autoclave the rotor for 60 minutes at 132 °C.

Note: Open the lid to allow steam penetration inside the rotor.

WARNING!

All rotor seals can be sterilized with the rotor, either chemically or by autoclaving. Frequent autoclaving may decrease the useful life of the seals. All seals will eventually show signs of wear, such as discoloration, dryness (or brittleness), cracks, or stretching. Replace seals yearly, or whenever they show any signs of wear.

This procedure sterilizes the rotor, inactivating even highly resistant agents such as the Creutzfeldt-Jakob Disease virus (CJD).

WARNING!

These decontamination procedures are for routine use only. For shipping the rotor or components to Elitech Group for repair or service, contact Elitech Group service or your local distributor for a current copy of the decontamination and shipping instructions before preparing and shipping the instrument. Shipping the rotor or components without decontaminating them according to these instructions will result in a significant decontamination charge and is dangerous to service personnel. If you intend to ship the rotor to another location or to discard it you must refer to Section 4.3.

SECTION 4
CLEANING AND MAINTAINING CYTOPRO

4.2 Cleaning and Decontamination Procedures

Chemically Disinfecting Single or Dual Chambers

- 1 Remove used Cytopads as described in Section 3.1.
- 2 Submerge chambers and frames in diluted (1/10) household bleach. Make dilution fresh each day.
- 3 Soak for at least one hour.
- 4 Scrub interior chamber surfaces with detergent-soaked cotton-tipped swab to remove residual cells.

Note: *This procedure is effective against Hepatitis B (HBV) and HIV and is at least partially effective against CJD. Treatment with sodium hypochlorite followed by 1N sodium hydroxide for 1 hour is considered completely effective against CJD.*

CAUTION!

Using sodium hydroxide on the rotor can cause serious damage.

- 5 Rinse thoroughly with deionized water and dry before reuse.

Autoclaving Single or Dual Chambers

- 1 Submerge the frame and chamber in any dilute detergent solution.
- 2 Remove frame and chamber from the detergent solution.
- 3 Autoclave for at least one hour at 132 °C for complete sterilization and certain inactivation of CJD virus.

Note: *While the Cytopro single or dual chambers are reusable, autoclaving limits chamber life. Discard any chamber, frame, or cap that appears distorted or will not fit with other components. Most chambers can be autoclaved up to 20 times without showing any signs of degradation. CYTOPRO MAGNUM CHAMBERS ARE NOT REUSABLE. DO NOT ATTEMPT TO CLEAN OR REUSE.*

SECTION 4
CLEANING AND MAINTAINING CYTOPRO

4.3 Shipping or Disposing of the Rotor

Shipping the Rotor

WARNING!

You must disinfect the rotor before returning it to Elitech Group. The operating authority must complete a Hazard Free Certification Form (see below), otherwise the distributor or service center may not accept the instrument; or customs authorities may hold it.

CAUTION:

Shipping the rotor without decontaminating it according to these instructions is dangerous to service personnel. You will be charged additional fees for decontamination performed by Elitech Group.

CAUTION:

Ship the instrument in a container comparable to its original packaging.

Hazard Free Certification Form

The operating authority must print and complete the Hazard Free Certification Form (DOC4-00034) obtained from Customer Service.

Attach the declaration to the top of the instrument package before sending the package to Elitech Group.

Disposing of the Rotor

The Cytopro rotor 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 Elitech Group.

SECTION 5 CUSTOMER SERVICE

Elitech Group'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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Critical Reagent Components



The following information is to identify the critical chemicals of each reagent used in this instrument.

SS-133 Decontamination Solution Concentrate contains:

- <30% Germicidal Detergent
- >70% Deionized Water

SS-133 Decontamination Solution Concentrate is associated with the following Hazard and Safety Precautionary Statements. The associated Word is: Danger.

H226	Flammable Liquid and vapor
H314	Causes severe skin burns and eye damage
H317	May cause an allergic skin reaction
H351	Suspected of causing cancer
H361	Suspected of damaging fertility or the unborn child
H373	May cause damage to organs through prolonged or repeated exposure
H410	Very toxic to aquatic life with long lasting effects
P201	Obtain special instructions before use
P202	Do not handle until all safety precautions have been read and understood
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233	Keep container tightly, closed
P260	Do not breathe mist, spray vapors
P264	Wash hands thoroughly after handling
P273	Avoid release to the environment
P280	Wear protective gloves/protective clothing/ eye protection/face protection
P301+P330P+P331	If swallowed: rinse mouth. DO NOT induce vomiting.
P303+P361+P353	If on skin (or hair): Take off immediately contaminated clothing. Rinse skin with water/shower.
P304+P340	If inhaled: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338	IF IN EYES: Rinse cautiously, with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P310	immediately call a doctor, a POISON CENTER.
P362+P364	Take off contaminated clothing and wash it before reuse.
P370+P378	In case of fire: Use alcohol resistant foam, BC-12owder, carbon dioxide (CO2). D-Powder to extinguish.
P403+P235	Store in a well-ventilated Place. Keep cool.
P501	Dispose of contents/container to hazardous or special waste collection Point, in accordance with local, regional, national and/or international regulation.

APPENDIX

B

Accessories and Supplies

Only replacement parts supplied by Elitech Group should be used with the Cyopro Cyto centrifuge. Use of non-approved parts may affect the performance and safety features of this product.

ACCESSORIES	REFERENCE NUMBER
Cyopro Cyto centrifuge Rotor	AC-160

SUPPLIES	REFERENCE NUMBER
Cyopro Rotor Maintenance Kit.....	SS-060
Chamber Caps (package of 48)	SS-110
Fast (White) Cytopad Absorption Pads (box of 100)	SS-111
Slow (Tan) Cytopad Absorption Pads (box of 100)	SS-112
Sample Chambers with Fast (White) Cytopads and Caps (box of 48)	SS-113
Sample Chambers with Slow (Tan) Cytopads and Caps (box of 48)	SS-114
Sample Chambers with Fast (White) Cytopads (box of 48)	SS-115
Sample Chambers with Slow (Tan) Cytopads (box of 48).....	SS-116
Uncoated Custom Microscope slides for Cyopro (box of 1/2 gross).....	SS-117
Poly-L-Lysine Coated Custom Microscope Slides for Cyopro (box of 1/2 gross).....	SS-118
Decontamination Solution Concentrate (4 mL bottle dilutes to 500 mL)	SS-133
Dual Sample Chamber Caps (package of 48)	SS-210
Fast (White) Cytopad Dual Sample Absorption Pads (package of 100)	SS-211
Slow (Tan) Cytopad Dual Sample Absorption Pads (package of 100).....	SS-212
Dual Sample Chambers with Caps and Fast (White) Cytopads (package of 48).....	SS-213
Dual Sample Chambers with Caps and Slow (Tan) Cytopads (package of 48).....	SS-214
Dual Sample Chambers with Fast (White) Cytopads (package of 48)	SS-215
Dual Sample Chambers with Slow (Tan) Cytopads (package of 48)	SS-216
Uncoated Custom Microscope Slides for Cyopro Dual Sample Chambers (box of 1/2 gross)	SS-217
Poly-L-Lysine Coated Custom Microscope Slides for Cyopro Dual Sample Chambers (box of 1/2 gross)	SS-218
Uncoated Custom Microscope Slides for Cyopro Magnum Sample Chambers (box of 1/2 gross)	SS-232
Poly-L-Lysine Coated Custom Microscope Slides for Cyopro Magnum Sample Chamber (box of 1/2 gross)	SS-233
Cyopro Magnum Chambers with Caps (box of 24)	SS-234

REPLACEMENT PARTS FOR AC-160 ROTOR	REFERENCE NUMBER
Lid Knob Assembly.....	RP-267
Ball Housing Assembly.....	RP-265
Hub Seal.....	RP-268
Bowl Seal	RP-269
Rotor Lid Assembly.....	RP-221
Cyopro Rotor Applications Manual (Aerospray Models 7xx2)	RP-517
Cyopro Methods Manual	RP-451

Contact Elitech Group for a complete list of replacement parts.