

# Corning® X-WASH® System

CORNING

## Instruction Manual

Catalog Numbers:

6928 6931

6929 6932

6930 6933



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# 1.0 Introduction

The Corning® X-WASH® System is a semi-automated, functionally closed, system that separates, washes, and volume-reduces cell samples to a programmable volume. The X-WASH System is used with a commercially available centrifuge and personal computer (not supplied).

The system consists of four major components:

- Corning X-WASH Disposable Cartridge, single-use
- Corning X-WASH Control Module, rechargeable
- Corning X-WASH Docking Station, AC-powered
- X-SERIES® DataTrak Software

The Corning X-WASH Control Module component of the X-WASH System is a microprocessor-controlled device, which works in combination with the Corning X-WASH Disposable Cartridge during centrifugation to direct the transfer of cells into a separate compartment within the Disposable Cartridge. After centrifugation, the X-WASH Control Module is placed on the Corning X-WASH Docking Station to download processing data using the X-SERIES DataTrak Software.

## Intended Use

The Corning X-WASH System is general lab equipment to be used to wash and/or concentrate cell suspensions.

## Overview

For the purposes of the intended use, the input volume is limited to a range of approximately 40 mL to 240 mL, with an output max (or cell concentrate volume) of approximately 40 mL. Average processing time is approximately 17 minutes (single wash).

The sample of thawed blood along with thaw media to be processed is placed in the sterile, functionally closed X-WASH Disposable Cartridge for processing. High-speed and low-speed centrifugation is used to separate cells from cryoprotectant using a commercially available programmable centrifuge, such as the Thermo Scientific Sorvall™ Legend™ XT or XTR, and the Hettich ROTANTA 460.






















**NOTE:** For the purpose of this instruction manual, thawed blood samples will be used in all examples and process steps, with the goal of collecting a cell fraction that has been washed and resuspended. Thawed blood demonstrates the basic system operation. For information about specific processing differences or requirements for other cellular products, please contact Corning Scientific Support at USA/Canada: 1.800.492.1110 Option 3, +1.978.442.2200 Option 3, or email [ScientificSupport@corning.com](mailto:ScientificSupport@corning.com). Outside of the US, visit [www.corning.com/lifesciences](http://www.corning.com/lifesciences) or contact your local support office (see the back of instruction manual).

During the initial high-speed portion of the centrifugation (2,000 RCF), the cells in the thawed blood pellet at the base of the cone in the Disposable Cartridge. The speed is then lowered to 50 x g, and the cells are directed to the Disposable Cartridge harvest compartment, which has been pre-filled with resuspension media. The bulk of media and cryopreservative is retained in the central compartment of the cartridge.

Once the centrifuge cycle ends, the operator places the Control Module on the Docking Station and follows the DataTrak software screen instructions to download the processing data. The battery within the Control Module is also recharged for the next blood separation procedure.

## Symbol Keys

The following symbols and abbreviations are used on the Corning® X-WASH® System labeling, packaging, or within this instruction manual.

 Sterile fluid path	 Sterile fluid path using irradiation
 Expiration date	 Do not re-use
 Non-pyrogenic	 Do not trash as municipal waste
 Indicates that a product has been evaluated to applicable European directives	 Batch code
 Catalog number	 Serial number
 Manufacturer	 Caution to be observed by the user
 Warning to be observed by the user	 Temperature limit
 Keep dry	 Humidity
 Pressure	 Do not use if package is damaged
 Follow Instructions for Use	 Direct Current
 Consult Instructions for Use	

## Glossary of Definitions and Abbreviations

Below are abbreviations that are used in this Instruction Manual and their associated definitions.

Term	Definition
Cell Concentrate	The targeted concentration of white blood cells separated from cryoprotectant and media.
Control Module	Provides the mechanisms that open and close the valve on the Disposable Cartridge to direct components of blood to their respective compartments.
CSV	Comma Separated Values
DataTrak Software	Proprietary data management system which collects processing and system information through a user interface and stores it in a searchable, sortable database.
Disposable Cartridge	Single-use device with a sterile, non-pyrogenic fluid path.
Docking Station	Provides communication link to DataTrak Software and enables charging of the device battery.
IEC	International Electrotechnical Commission
LED	Light Emitting Diode
PC	Personal Computer
PDF	Portable Document Format
Corning® X-WASH® System	Cell processing system that includes: Disposable Cartridge, Control Module, Docking Station, and DataTrak Software
RCF	Relative Centrifugal Force or g-force
RF	Radio Frequency

## Warranties

Corning Incorporated has reviewed the contents of this manual. All statements, technical information and recommendations contained in this manual are current and believed to be reliable. Manual contents are not intended to be and should not be understood as representations or warranties for the Corning® X-WASH® System. The contents of this manual are provided “as is” and without warranties of any kind, either express or implied.

The Corning X-WASH System is covered by specific and limited warranties, as described in this chapter.

For questions about Corning X-WASH System warranties, or if warranty repairs are needed, contact an authorized distributor or Corning Incorporated.

Fill out the box below for future reference:

Distributor Name \_\_\_\_\_

Contact Name \_\_\_\_\_

Email \_\_\_\_\_

Phone Number \_\_\_\_\_

Hours of Operation \_\_\_\_\_

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Outside of the U.S., visit [www.corning.com/lifesciences](http://www.corning.com/lifesciences) or contact your local support office (see the back of instruction manual).

When calling for service or repairs, have available:

- Detailed information about the problem
- Serial numbers and date/place of purchase of Control Module and Docking Station
- Disposable lot number and expiration date
- Service record given at time of training

## Limited Warranty

Corning warrants to the original purchaser that the Corning® X-WASH® Control Module and X-WASH Docking Station (referred to as a “X-WASH Instrument”) will be free from defects in material or workmanship for one (1) year from date of shipment. Installation documents must be completed and returned to Corning for the warranty to be recognized. Failure to provide such documentation may result in the warranty being considered null and void.

In the event that an X-WASH Instrument does not conform to the foregoing warranty, Corning will, at its option, repair the nonconforming X-WASH Instrument, provide a free replacement, or grant you an appropriate credit. These alternatives shall be your sole and exclusive remedy in the event of a failure to comply with the foregoing warranty.

Corning also warrants that replacement parts of the X-WASH Instruments will be free from defects in material and workmanship for the remaining portion of the original warranty, or, if longer, the minimum time required by applicable local law, from date of shipment of replacement part.

X-WASH Instruments may fail or malfunction for reasons other than those caused by defects in materials or workmanship (such as improper handling of the machine, misuse, accident, or non-compliance with the Instruction Manual. Any such failure is not covered under the Corning warranty and such X-WASH Instrument will be replaced or repaired at the cost of the end-user.

Any alterations or modification made to an X-WASH Instrument (other than those made by Corning) will render the warranty null and void.

Corning shall under no circumstances be liable to you or any other party, under any circumstances, for any special, consequential, indirect or punitive damages such as loss of capital, loss of use, substitute performance, loss of production, loss of profits, loss of business opportunity, or any other claims for damages, even if such losses or damages are reasonably foreseeable.

**THE FOREGOING WARRANTIES, AS SET FORTH HEREIN, ARE EXCLUSIVE AND ARE IN LIEU OF, AND YOU HEREBY WAIVE, ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR WARRANTY OF NON-INFRINGEMENT.**

## 2.0 Safety

### Warnings



A WARNING is a statement preceded by this symbol that alerts the user to the possibility of injury, death, or other serious adverse reactions associated with the use or misuse of the device.

- Read this instruction manual completely prior to using the Corning® X-WASH® System.
- Always follow internal policy for personal protective equipment such as gloves, gowns, eyewear, or masks when using the X-WASH System.
- Always follow established procedures for handling and discarding biohazardous materials.
- The X-WASH System has been optimized for 40 mL to 240 mL input volume and other volumes will yield unknown results.
- Operators should be trained on the X-WASH System prior to initial use
- Follow aseptic procedures.
- The Corning X-WASH Disposable Cartridge is a single-use device with a sterile, non-pyrogenic fluid path. Do not use if packaging or product is damaged. Do not re-sterilize. Follow internal policy for proper disposal of used Disposable Cartridge.
- No modification of this equipment is allowed. Only Corning authorized replacement parts may be used.
- MEDICAL/LABORATORY ELECTRICAL EQUIPMENT needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in this manual.
- Do not exceed 2,000 RCF centrifugation at any time as an inappropriate transfer of cellular components between compartments may occur, causing a loss of cell functionality requiring the sample to be discarded.

### Cautions



A CAUTION is a statement preceded by this symbol that alerts the user to the possibility of a problem with the device associated with its use or misuse. Such problems include device malfunction, device failure, damage to the device, or damage to other property. The caution statement includes the **precaution** that should be taken to avoid the hazard.

- Operators should be trained on the Corning X-WASH System prior to initial use.
- Do not insert any objects, including fingers, into the Corning X-WASH Control Module while powered on or at any other time.



- Follow aseptic procedures.
- Avoid liquid contact with the X-WASH Control Module internal components. In the event that liquids enter the X-WASH Control Module, contact Corning.
- Handle the X-WASH Control Module and Docking Station with care.
- When connected to another device, the overall system must be evaluated to IEC 60601-1 3rd edition by the end user.
- Avoid dropping any of the components of the X-WASH System as this may cause damage.
- Keep the X-WASH Disposable Cartridge upright during and after filling to prevent fluids from entering the 0.2 micron air filter as this may affect airflow through the filter.
- The X-WASH Control Module battery should be charged in the X-WASH Docking Station overnight or for at least 6 hours prior to initial use.
- Only use the X-SERIES® DataTrak Software for downloading and storage of processing information.
- Ensure that the computer is virus-free and has the latest update of antivirus software prior to installing DataTrak Software.
- Update the operating system, service pack, and antivirus software on a regular basis.
- Do not leave an internet connection active while installing or using DataTrak.
- The user-provided Sample Label barcode must be in ISBT or code 128 format to be compatible with the DataTrak Software.
- Prior to starting centrifugation, ensure the following:
  - Battery status indicator on the Corning Control Module is green when placed on the Corning Docking Station
  - Corning® X-WASH® Control Module is OFF before latching the X-WASH Disposable Cartridge
  - Corning X-WASH Disposable Cartridge is fully latched into the X-WASH Control Module
  - Control Module is turned ON and “0” is displayed in the STATUS DISPLAY window before centrifugation.
- Prior to cleaning, power down the X-WASH Control Module, and unplug the X-WASH Docking Station.
- The X-WASH System has been optimized for 40 mL to 240 mL input volume and other volumes will yield unknown results.

## Standards and Regulations

The Corning® X-WASH® System was tested and found to meet all regulations and recommendations contained in this document, which are in compliance with the appropriate international safety standards. This includes electrical instruments used in laboratory, protection of laboratory staff and electrical safety.

## EMC Compliance Information

Unit complies with requirements within the European Union's Electromagnetic Compatibility (EMC) Directive 2014/30/EU. Limits are designed to provide reasonable protection against harmful interference in a typical facility. This equipment generates, uses and can radiate radio frequency energy, and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to other devices in the vicinity. There is no guarantee, however, that interference will not occur in a particular facility. If this equipment causes interference with other devices, which may be determined by turning equipment off and on, user is encouraged to try and correct interference by one or more of the following measures:

- Reorient or relocate device receiving interference
- Increase separation between equipment
- Connect equipment to a different outlet than the one connected to the other device
- Consult manufacturer or field service technician for help



**MEDICAL/LABORATORY ELECTRICAL EQUIPMENT** needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in this manual.


**NOTE:** The EQUIPMENT is intended for use in the electromagnetic environment specified below. The customer or the user of the EQUIPMENT should assure that it is used in such an environment.

Guidance and Manufacturer's Declaration – Electromagnetic Emissions for All Manufacturer's Equipment and Manufacturer's Systems		
Emissions Test	Compliance	Electromagnetic Environment Guidance
RF emissions CISPR 11	Group 1	The Corning® X-WASH® System uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The Corning X-WASH System is suitable for use in all establishments, including domestic establishments and those directly connected to the public low voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/flicker emissions IEC 61000-3-3	Complies	

Guidance and Manufacturer's Declaration – Electromagnetic Immunity for All Manufacturer's Equipment and Manufacturer's Systems			
Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment Guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV line(s) to line(s) ±2 kV line(s) to earth	±1 kV line(s) to line(s) ±2 kV line(s) to earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% UT (>95% dip in UT) for 0,5 cycles 40% UT (60% dip in UT) for 5 cycles 70% UT (30% dip in UT) for 25 cycles <5% UT (>95% dip in UT) for 5 s	<5% UT (>95% dip in UT) for 0,5 cycles 40% UT (60% dip in UT) for 5 cycles 70% UT (30% dip in UT) for 25 cycles <5% UT (>95% dip in UT) for 5 s	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Corning X-WASH System requires continued operation during power mains interruptions, it is recommended that the X-WASH System be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

**NOTE:** UT is the A.C. mains voltage prior to application of the test level.

**NOTE:** The EQUIPMENT is intended for use in the electromagnetic environment specified below. The customer or the user of the EQUIPMENT should assure that it is used in such an environment.

Guidance and Manufacturer's Declaration – Electromagnetic Immunity for Equipment and Systems that are not Life Supporting			
Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment Guidance
Conducted RF IEC 61000-4-6	3 Vrms	3 Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the Corning® X-WASH® system, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance  $d = 1.2 \sqrt{P}$ $d = 1.2 \sqrt{P}$ 80 MHz to 800 MHz $d = 2.3 \sqrt{P}$ 800 MHz to 2,5 GHz  Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).  Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey <sup>a</sup> , should be less than the compliance level in each frequency range <sup>b</sup> .  Interference may occur in the vicinity of equipment marked with the following symbol: 
Radiated RF IEC 61000-4-3	150 kHz to 80 MHz	3 V/m	
	3 V/m  80 MHz to 2,5 GHz		
<p><b>NOTE 1:</b> At 80 MHz and 800 MHz, the higher frequency range applies.</p> <p><b>NOTE 2:</b> These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</p> <p><sup>a</sup>Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the X-WASH System is used exceeds the applicable RF compliance level above, the X-WASH System should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the X-WASH System.</p> <p><sup>b</sup>Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.</p>			

**NOTE:** The X-WASH System is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the X-WASH System can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the X-WASH System as recommended below, according to the maximum output power of the communications equipment.

Recommended Separation Distances Between Portable and Mobile RF Communications Equipment and the Corning X-WASH System			
Rated Maximum Output Power of Transmitter W	Separation Distance According to Frequency of Transmitter M		
	150 kHz to 80 MHz d = 1.2 √P	80 MHz to 800 MHz d = 1.2 √P	800 MHz to 2,5 GHz d = 2,3 √P
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

**NOTE 1:** At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

**NOTE 2:** These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

## 3.0 Corning® X-WASH® System

The Corning X-WASH System is composed of the following components:

Cat. No.	Description
5712	Corning X-WASH Disposable Cartridge
6928	Corning X-WASH Control Module with associated firmware
6929	Corning X-WASH Docking Station with associated firmware
6930	X-SERIES® DataTrak Software

Corning provides the following suggested products for use with the Corning X-WASH System:

Cat. No.	Description
6923	Corning X-Balance Ring Kit
6934	Corning X-Mixer
6935	Corning X-WASH Accessory Kit
6922	Low
6921	Medium
6920	High

The Corning® X-WASH® System **requires** the following instrumentation for operation. These are **not provided** by Corning:

- Programmable centrifuge with 750 mL buckets (Thermo Scientific Sorvall™ Legend™ XT or XTR, Hettich ROTANTA 460)
- Computer (e.g., desktop, laptop PC, or tablet) with Windows® 7 or 10 Operating System and at least one available USB port (additional USB port required for optional barcode scanner)
- Tube Sealer (Genesis Rapid Seal II™ SE540)

Materials and equipment that are **required but not supplied**:

- 40 mL to 240 mL of cellular sample to be processed
- Biological safety cabinet or clean room area
- Digital scale
- Label printer(s) for component labeling (if applicable)
- Syringes for sample (if applicable)
- Labels for components and sample tubes (if applicable)

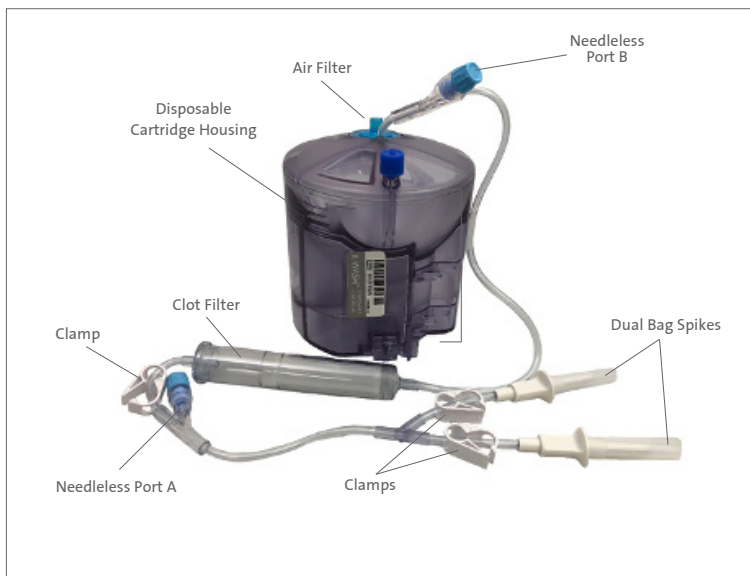
### **Corning X-WASH Disposable Cartridge**

The Corning X-WASH Disposable Cartridge is a dedicated sterile, plastic, single-use processing container and comprises the fluid path of the system. The thawed sample and thaw media is transferred into the Disposable Cartridge through a 150 micron clot filter. The Corning Disposable Cartridge is latched into the Corning X-WASH Control Module for subsequent centrifugation following a preprogrammed profile described below. Integrated within the Disposable Cartridge is a mechanism that pinches or releases the tubing, allowing for transfer of the cellular components during centrifugation. The Control Module manages this operation.

#### **Blood Thaw Wash Centrifuge Profile Example**

- The centrifuge accelerates to 1,000 RCF to allow the cell suspension to pellet into the cone at the base of the Disposable Cartridge.
- The centrifuge then lowers to 50 RCF and the pelleted cells are transferred through transfer tubing to the Harvest Compartment leaving the bulk of supernatant retained in the processing compartment.
- The centrifuge decelerates and stops spinning, the washed cells can now be removed.

## Corning® X-WASH® Disposable Cartridge Components



The components of the Corning X-WASH Disposable Cartridge are described below:

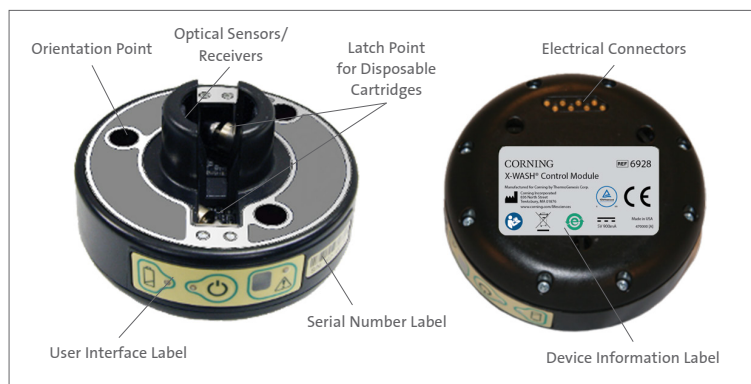
- Air Filter: A 0.2 micron hydrophobic filter that facilitates air management during filling.
- Disposable Cartridge Housing: Contains the individual harvest compartments, the central funnel compartment, and integrated pinch mechanisms.
- Needleless Port A is used for input of thaw media.
- Needleless Port B is used for removal of sample from sample pillow.
- Sample Access Tube is used for the collection of harvested cells and is located on the opposite side of the lot number label (not shown).
- Sample Output Luer Lock is a female luer lock through which the harvest is removed by syringe (not shown).
- Dual Bag Spikes are used for insertion into the sample bag
- Clot Filter: A 150 micron filter to remove particles from cellular input during sample input.
- Pinch Clamps located throughout the input line are used to control fluid flow.

## Corning® X-WASH® Control Module

The Corning X-WASH Control Module is a battery-operated, microprocessor-controlled, electromechanical device with two motor/gear/cam assemblies that rotate in order to pinch or release tubing in the Corning Disposable Cartridge to direct the cell concentrate to the harvest compartment.

The X-WASH Control Module is also equipped with an accelerometer to measure acceleration and four optical sensors that detect interfaces cell concentrate and the supernatant, all powered by a lithium ion battery. The paired sensors can detect the boundary between the supernatant and cell concentrate when the passage of infrared light is blocked, then unblocked. The Control Module uses the detected boundary to open and close the transfer tubes in the Disposable Cartridge. The Control Module's firmware gathers and stores the accelerometer's output and the timing and release of the pinch mechanism during each processing run for upload to the X-SERIES DataTrak Software.

### Corning X-WASH Control Module Components

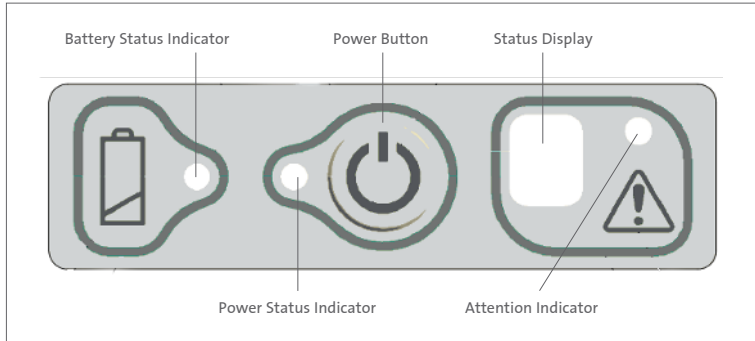


- **Optical Sensors and Receivers:** Four optical sensors and receivers that detect the cell interfaces during centrifugation
- **Latch Point for Disposable Cartridges:** The two connections for latching the Disposable Cartridge to the Control Module
- **Disposable Cartridge Orientation Points:** The three points for the Disposable Cartridge feet that insure correct orientation when connecting
- **Device Information Label:** Provides information specific to the Control Module as well as Corning contact information
- **Electrical Connectors:** The connectors that make contact with the Docking Station and facilitate data transmission and the Control Module battery charging



- Serial Number Label: Control Module barcode and human readable text label
- User Interface Label: Contains the power button, as well as displays battery status, error codes, and power status

### Corning User Interface Label



#### Battery Status Indicator

When power button is pressed, steady **green** indicates that the battery has a sufficient charge to perform a harvest process.

When power button is pressed, steady **red** indicates that the battery is insufficiently charged. The operator should immediately charge the battery.

When the Control Module is placed on the Docking Station for charging, the Battery Status Indicator will blink at the following rates in response to battery charge levels:

- **Green** 1-blink pattern      Leave on Docking Station to charge
- **Green** 2-blink pattern      Charge soon
- **Green** 3-blink pattern      Ready to use
- **Green** Steady                  Fully charged and ready to use

#### Power Button

- Press this button for approximately one (1) second to power ON the Control Module.
- Press and hold for approximately three (3) seconds to power OFF the Control Module.

#### Power Status Indicator

- **Green** indicates that the Control Module is powered ON.
- No illumination indicates that the Control Module is powered OFF.

## Status Display

Displays the status or error code of the Control Module. Standard Status Codes are described below. Refer to Troubleshooting (Chapter 10) for error codes and additional information.

Character	Definition	Process Description
0	Ready to operate	The Control Module is ready for processing
P	Pass	The process is has completed successfully
dP	Data present	The data needs to be downloaded in preparation for a new processing run

## Attention Indicator

- **Green** indicates that the Control Module is ready for processing or has successfully completed a centrifugation process.
- **Red** indicates that the Control Module has failed a centrifugation process, has gone into an error state, or the Control Module was powered down prior to downloading the data. The operator should assess which of these situations has occurred, and take appropriate remedial actions (see Troubleshooting Chapter 10)

## Corning® X-WASH® Docking Station

The Corning X-WASH Docking Station is a multifunctional system component that concurrently charges the battery of the Corning Control Module and enables transmission of data to and from the Control Module onto a host Windows® computer.

### Docking Station Components

The components of the Docking Station are described below:

- **Connector Pins:** Retractable pins which align and contact with electrical connectors on the bottom of the docked Control Module for data communication and battery charging.
- **User Interface Label:** Identifies the device and allows the user to see an LED with three states:
  - **Green** indicates that a Control Module is present and charging.
  - **Red** indicates that no Control Module is present, or the Control Module is present but not seated properly, or Control Module is not functional. The operator should assess which of these situations has occurred and take appropriate actions to remedy.
- **No illumination** indicates that the Docking Station is not receiving power.
- **USB Data Port:** Port for connection to the host computer via the USB cable.
- **Power Cord Port:** Port for connection to the external power source via the power cable. To remove mains power, unplug the cable from the wall.

Connector Pins



User Interface Label



USB Data Port

Power Cord Port



USB Cable

Link



Device Information Label

- Device Information Label: Provides information specific to the Docking Station as well as Corning contact information.
- USB Cable: Connects the Docking Station to the Windows Computer or tablet to allow for the transfer of Control Module data.

## Accessories




### Corning® X-Balance Ring Kit

The Corning X-Balance Rings are specifically designed for use with the Corning X-WASH® System for balancing the contents of the centrifuge prior to centrifugation. They are provided in 2.5 and 7.4 gram weights.

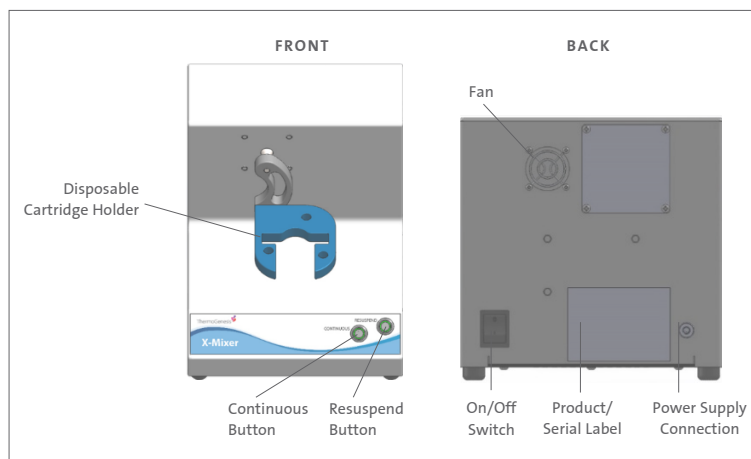


### Corning X-Counterweights

The Corning X-Counterweight set is specifically designed for use with the Corning X-WASH System for balancing the contents of the centrifuge prior to centrifugation. Three different weights: LOW, MEDIUM, and HIGH are provided to accommodate a range of different input volumes.

X-Counterweight	LOW	MEDIUM	HIGH
Cat. No.	6922	6921	6920
Input Volume (mL)	40 to 110	111 to 170	171 to 240
Image			

## Corning® X-Mixer



The **Disposable Cartridge Holder** holds the Disposable Cartridge during the mixing cycles.

The **Resuspend Button** resuspends pelleted cells after the supernatant has been removed.

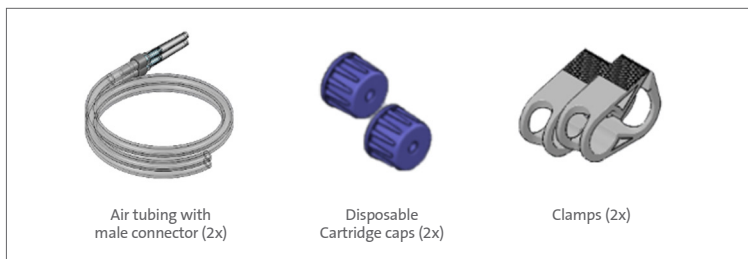
The **Continuous Button** mixes larger volumes within the Disposable Cartridge.

The **Fan** prevents the X-Mixer from overheating.

**On/Off Power Switch** turns the X-Mixer on or off. Press to turn on (I) or off (O).

The **Power Cord Connection** is used for connection to the external power source via AC/DC adapter and the power cord.

## Corning® X-WASH® Accessory Kit



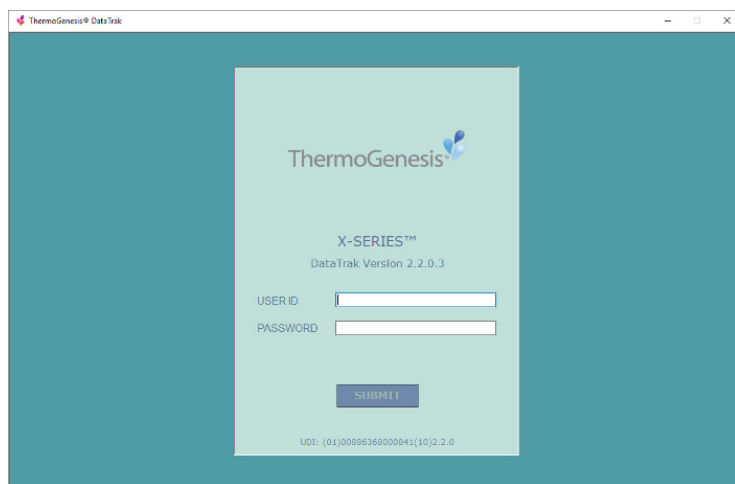
The **Air tubing with male connector** attaches to the air filter of the Disposable Cartridge and a peristaltic pump to facilitate fluid transfer in and out of the Disposable Cartridge.

**Disposable Cartridge caps** help prevent the air filter on the Disposable Cartridge from getting wet during mixing.

Pinch **Clamps** are used to control fluid flow in and out of the Disposable Cartridge.

## 4.0 X-SERIES® DataTrak Software

The X-SERIES DataTrak Software is the application that provides the interface between the operator and the Corning X-WASH System through a host computer. It downloads processing and system information and stores it in a searchable, sortable database on the host computer. The data collected includes information gathered during each processing run and serves as a means to support GMP compliance. The DataTrak System Software includes the Microsoft® MS SQL Server as the database server for a host computer.



### X-SERIES DataTrak Software Use

The DataTrak Software is intended for use with X-SERIES products only. X-SERIES products include Corning X-LAB®, Corning X-WASH®, and Corning X-BACS™ systems. Software users should be familiar with the applicable X-LAB System components prior to using the DataTrak Software. DataTrak is not intended for use with computer system specifications other than those listed under Computer System Requirements in Chapter 12 Specifications.

### User Profiles

The DataTrak Software has three user profiles that are designed to restrict software operations based on level of responsibility.

#### *Lab Technician User*

The Lab Technician User can download the data from the Corning X-WASH System components, view the data history, customize their software views, and change their password. In addition, they can also save report as PDF, add notes to report and print, as well as view raw Control Module data.

### Lab Supervisor User

The Lab Supervisor User level has the same abilities as the Lab Technician User profile with the addition of the ability to approve reports.

### Administrator User

The Administrator User profile is a management function level only. The Administrator User can add, edit, or inactivate users, serial numbers of the system equipment, and lot numbers of the disposable components. The Administrator User does not have the ability to download data from the System components or view data history. This ability is restricted to the Lab Supervisor and Lab Technician User profile.

## X-SERIES® DataTrak Software Modes

The DataTrak Software is divided into two modes of functionality: Administration and Operations.

### Administration Mode

The ADMINISTRATION mode includes two sections of operating functions: Administration and Preferences. The active section will be highlighted in yellow. The Administration section provides the data record of users, equipment, and materials. Once data is entered it cannot be deleted – only edited or made inactive. Click the LOGOUT button to exit the administrative area and return to the login screen.

## Administration Section

The Administration section includes the following selections on the left side of the display screen for administrative functions. Selected sections will be highlighted in yellow.

User ID	User Role	First Name	Last Name	Phone Number	Active
Admin	Admin	Admin	Admin		<input checked="" type="checkbox"/>
Lab	Lab Technician	Lab	Cerk	112	<input type="checkbox"/>

### User Profile

Includes the following fields for data entry: USER ID, LAST NAME, FIRST NAME, PHONE NUMBER, USER ROLE and ACTIVE checkbox. Entered user information is displayed in a table below the data entry fields.

### Control Module

Primary screen displays a REGISTER CONTROL MODULE button and a table with the registered CONTROL MODULE ID, RECEIPT DATE and ACTIVE state. Clicking the REGISTER CONTROL MODULE button displays the REGISTER CONTROL MODULE field, which includes a field for the S/N barcode of the Control Module, DATE RECEIVED dropdown menu and a REGISTER button.

### Centrifuge

Includes the following fields for data entry: CENTRIFUGE SERIAL NUMBER, DESCRIPTION, CALIBRATION DUE DATE dropdown menu, and ACTIVE checkbox. Entered centrifuge information is displayed in a table below the data entry fields.

### Disposable Cartridge

Includes the following fields for data entry: DISPOSABLE CARTRIDGE LOT NUMBER, QUANTITY, EXPIRATION DATE dropdown menu, LOT RECEIVED DATE dropdown menu and ACTIVE checkbox. Entered Disposable Cartridge information is displayed in a table below the data entry fields.

## Preferences Section

The PREFERENCES section allows the Administrator, Lab Technician, and Supervisor to configure the software as indicated below. Click the SUBMIT button to accept the entry or the CANCEL button to cancel the entry.

The screenshot shows the 'Preferences' window in the ThermoGenesis X-SERIES™ software. The window title is 'ThermoGenesis® Data Tools' and the user is 'bit (Lab Technician)'. The 'Edit preferences' button is highlighted in orange. The main content area is titled 'Preferences' and includes sections for 'Automatic logout' (with a checked 'Log out after inactivity' checkbox and a '30' minute timeout), 'Starting top level item' (with 'History' selected), 'Password' (with fields for old, new, and confirm passwords), 'Expiration and maintenance warning' (set to '1' month), and 'Download preferences' (with a 'Show report after download' checkbox). At the bottom are 'SUBMIT' and 'CANCEL' buttons. A sidebar on the left shows 'Process', 'History', and 'Preferences' options.

### Automatic Logout

Includes a LOG OUT AFTER INACTIVITY checkbox and an up/down selection menu to configure a timeout from 10 to 500 minutes in 10-minute increments.

### Starting Admin Item

Includes selection buttons for the field displayed upon Admin login.

### Password

Includes the following entry fields for changing a login password:  
OLD PASSWORD, NEW PASSWORD, and CONFIRM NEW PASSWORD.

### Expiration and Calibration Warning

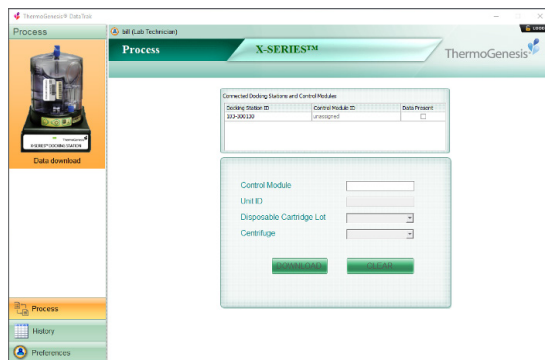
Includes up and down keys and dropdown menu selection to designate the amount of advance notification of expiration and calibration due dates in days, weeks, or months.

## Operations Mode

The OPERATIONS mode includes the three sections of operating functions: PROCESS, HISTORY, and PREFERENCES. The PROCESS section allows the user to download the data from the Corning® X-WASH® System components. Users cannot edit the data. Click the LOGOUT button to exit the OPERATIONS AREA and return to the login screen. The PROCESS section includes the following process options for data entry.

### Process Section

Select the X-SERIES® System picture to display the CONTROL MODULE DOWNLOAD field, which includes the following required entries for download: CONTROL MODULE SERIAL NUMBER, UNIT ID, DISPOSABLE CARTRIDGE dropdown menu, and CENTRIFUGE dropdown menu. A green checkmark will indicate a valid entry and a red "X" will indicate an invalid entry for the Control Module serial number, the Centrifuge serial number and the Disposable Cartridge Lot number.

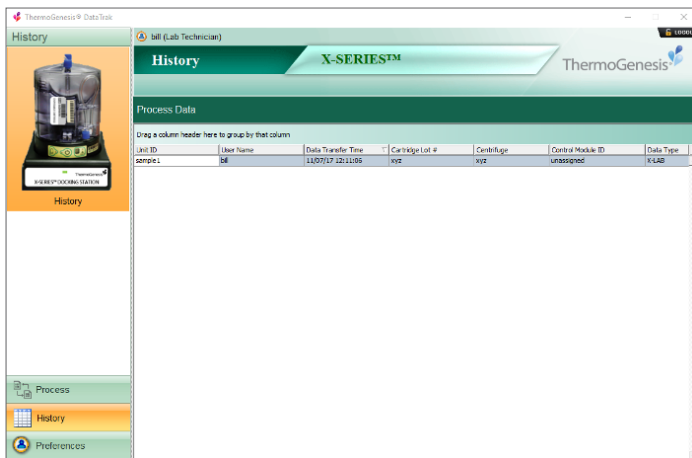




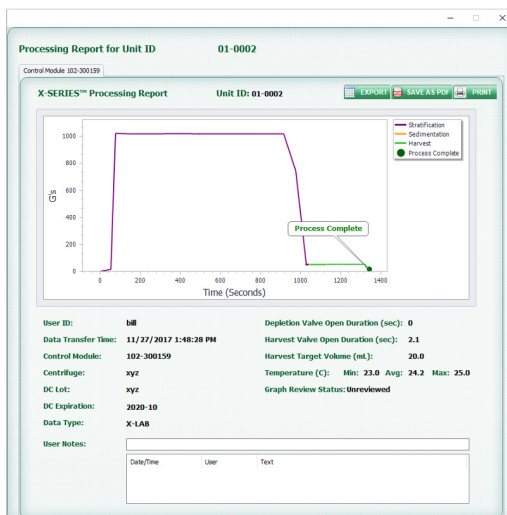
## History Section

The HISTORY section will display the data records for selected component (i.e., if the X-WASH SYSTEM SECTION is selected, the download data from the Control Modules will be listed).

To review a PROCESSING REPORT, click the appropriate UNIT ID.



The Control Module PROCESSING REPORT contains the following information:



Term	Meaning
UNIT ID	The Sample Unit ID for the process report.
EXPORT BUTTON	Allows the data to be exported as a CSV file.
SAVE AS PDF BUTTON	Allows the report to be saved as a PDF file.
PRINT BUTTON	Allows the report to be printed.
PROCESS GRAPH	Graphic display of the harvest process.
USER ID	The name of the user that was logged into the software when the data was downloaded.
DATA TRANSFER TIME	The date and time when the download occurred.
CONTROL MODULE	The serial number of the Corning® X-WASH® Control Module used for the harvest process.
CENTRIFUGE	The serial number of the centrifuge used for the harvest process.
DISPOSABLE CARTRIDGE LOT	The lot number of the Corning X-WASH Disposable Cartridge used for the harvest process.
DISPOSABLE CARTRIDGE EXPIRATION DATE	The Corning X-WASH Disposable Cartridge lot expiration date.
USER NOTES	An area to add comments to the processing record. A SAVE USER NOTE button appears after initial entry. Click SAVE USER NOTE to retain the comment.
DEPLETION VALVE OPEN DURATION	The time in seconds that depletion valve was open during the process (not applicable for X-WASH System).
HARVEST VALVE OPEN DURATION	The time in seconds that the harvest valve was open during the process.
HARVEST TARGET VOLUME	The target harvest volume.
DATA TYPE	The type of data downloaded from a specific system (i.e., Corning X-LAB®, X-WASH, X-BACS™ system).
TEMPERATURE (C)	The minimum, average, and maximum temperatures that occurred within the centrifuge during processing.
GRAPH REVIEWED STATUS	Dropdown menu where the Lab Supervisor can provide an electronic review/signature of the processing report.

# 5.0 Corning® X-WASH® System Operating Instructions



- Users are required to review the entire Instruction Manual prior to initial system use.
- Follow aseptic procedures.
- Operators should be trained on the X-WASH System prior to initial use.

## Acceptable Processing Volume

- The X-WASH System is intended to process between 40 mL and 240 mL of cellular products.



The X-WASH System has been optimized for a 40 mL to 240 mL input volume and other volumes will yield unknown results.

## Equipment and Materials


### Equipment

- Corning X-WASH Control Module
- Corning X-WASH Docking Station
- Programmable Centrifuge (Thermo Scientific Sorvall™ Legend™ XT or XTR, Hettich ROTANTA 460)
- Digital scale
- Tube Sealer (Genesis Rapid Seal II™ SE540)
- Computer with X-SERIES® DataTrak Software
- Tube welder (for closed processing)
- Corning X-Mixer
- Corning X-WASH Accessory Kit
- Peristaltic Pump (optional)
- Unit ID label generator


### Materials

- Corning X-WASH Disposable Cartridge
- Corning X-Counterweight (if processing an odd number of Disposable Cartridges)
- Balance rings
- Syringes
- Labels


## Preparing the Disposable Cartridge

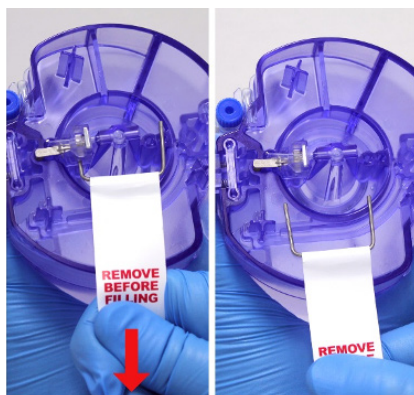
 Always follow established procedures for handling and disposing of biohazardous materials.

1. Remove the X-WASH Disposable Cartridge from its packaging. Visually inspect the Corning Disposable Cartridge for damage or irregularities.


 The X-WASH Disposable Cartridge is a single-use device with a sterile non-pyrogenic fluid path. Do not use if packaging or product is damaged or components are missing. Do not re-sterilize.

2. Remove the pin from the bottom of the Disposable Cartridge by pulling firmly and evenly on the tab in the direction shown in the figures below.

 Failure to remove the pin prior to loading the Disposable Cartridge could result in a decrease in cell recovery/viability or require use of another Disposable Cartridge.




3. Remove cap from air filter on the top of the Disposable Cartridge. Keep cap for future use.

 Failure to remove air filter cap may cause pressure buildup within the Disposable Cartridge during filling, which could cause sample backflow after filling, resulting in possible sample exposure and user exposure to potentially biohazardous materials.

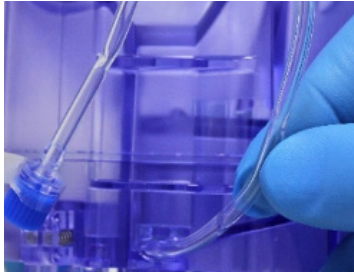
4. Make sure to close the clamp above the clot filter.

**NOTE:** For Multiple Washes, please refer to Multiple Washes Using X-Mixer and X-WASH Accessories section on page 38.

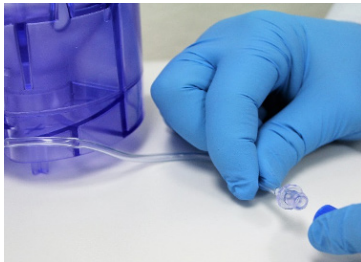
## Pre-filling the Corning® X-WASH® Disposable Cartridge for Processing (Optional)

 Perform these steps in a biological safety cabinet using aseptic techniques to maintain sterility.

1. Grasp the harvest chamber access tube (tube is opposite of the label), and release it gently from the three clamps.
2. Gently massage the tubing where it was clamped to ensure it is fully open.



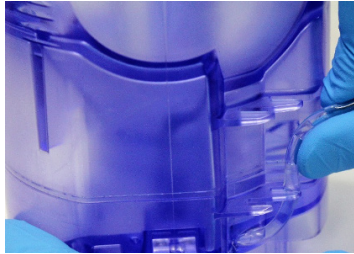
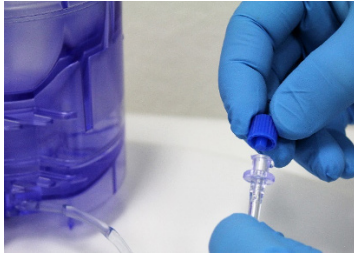
3. Remove Luer lock cap, and obtain syringe with desired resuspension media.



4. Attach syringe to Luer lock and inject media into the harvest chamber.

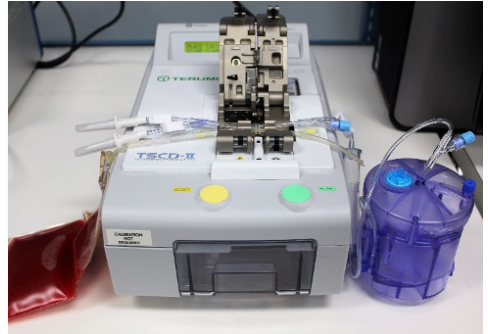


5. Replace the port cap and reinsert the tube into the four clamps.




### Filling the Corning® X-WASH® Disposable Cartridge for Processing

1. Obtain sample bag to be processed and insert bag spikes into the freeze bag.



**NOTE:** For closed processing, sterile weld processing bag with thaw media to input line above the clot filter.

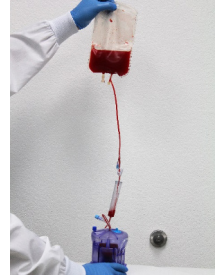
 Perform these steps in a biological safety cabinet using aseptic techniques to maintain sterility.


2. To wash sample bag, obtain syringes pre-filled with wash media and attach to needleless port located above the clot filter (open clamps if spike was used) and inject media into the sample bag at a constant and steady pace.
3. Rock sample bag gently to ensure thorough mixing.
4. Once the sample bag is filled with media, open all the clamps to allow the thawed blood with media to drain into the main chamber of the Disposable Cartridge.

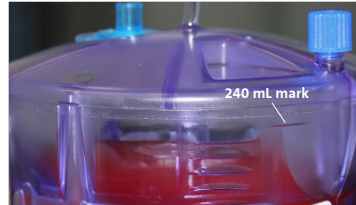


Keep the X-WASH Disposable Cartridge upright during and after filling to prevent liquids from entering the 0.2 micron air filter, as this may affect airflow through the filter.


5. Repeat steps 2-4 until the bag is rinsed with wash media.



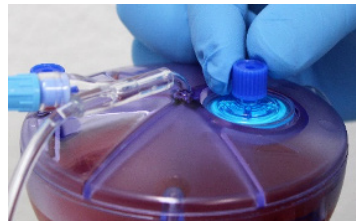
 Do not exceed 240 mL of fluid as it can cause spillover and the filter to be wet.



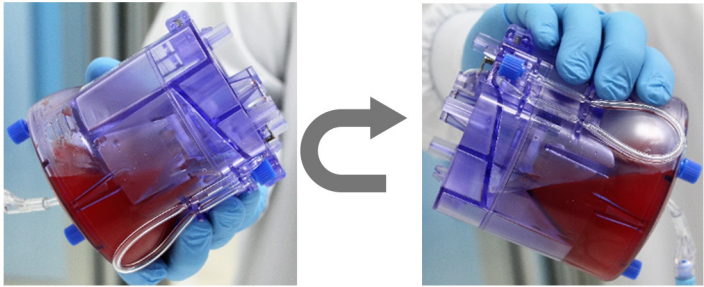
6. Carefully transfer the filled Disposable Cartridge to the tube sealer and seal the input line from the Disposable Cartridge directly below the clot filter, leaving as much tube length as possible. Separate and remove the tubing above the seal.

 Inadequate tube length on the input tubing can lead to Disposable Cartridge damage (including potential sample exposure) or centrifuge errors.

7. Replace blue cap on air filter.



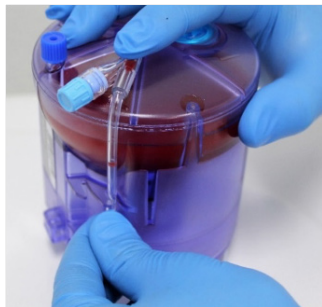
8. Mix the sample by rocking the Cartridge five times on its horizontal axis.



9. Once the Disposable Cartridge has been sufficiently mixed, an optional sample may be taken using the needleless port by removing cap on air filter, attaching a luer-lock syringe and withdrawing the sample. Ensure that the needleless port cap is replaced prior to proceeding with processing.

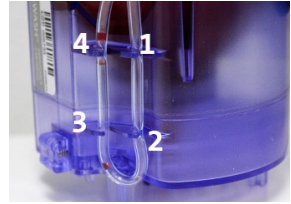



10. Make sure that the Y-connector containing the needleless port is flat on the surface of the Disposable Cartridge lid without excess slack as shown in the picture below.

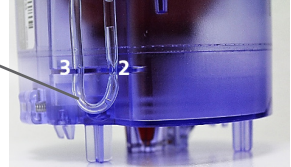




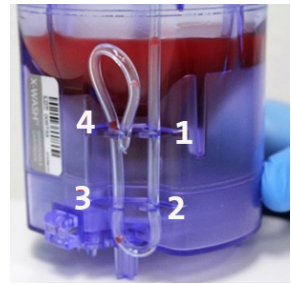
11. Place excess input tubing in the side pinches (same side as label) in the order shown below without excess tubing between pinches 2 and 3.



-  Excess tubing cannot go below the flat bottom surface of the Disposable Cartridge between pinch 2 and 3. Excess slack between pinch 2 and 3 can result in improper latching of Disposable Cartridge on Control Module.



12. Loop remaining excess input tubing around pinch 4 and place in pinch 4.



### Preparing the Disposable Cartridge for Centrifugation

-  Prior to starting centrifugation, ensure the following:

- Battery status indicator on Control Module is green when placed on the Docking Station.
- X-WASH Control Module is OFF before latching the X-WASH Disposable Cartridge
- X-WASH Disposable Cartridge is fully latched the X-WASH Control Module.
- Control Module is turned ON and “0” is displayed in the STATUS DISPLAY window before centrifugation.

1. Prior to latching a Disposable Cartridge onto a Control Module, obtain a Control Module and press the POWER button. Verify that the battery status indicator is green. If not, charge the Control Module before proceeding.

Do not insert any objects, including fingers, into the X-WASH Control Module.

2. Turn OFF the Control Module by pressing and holding the POWER button for approximately 3 seconds. Confirm that there are no lighted indicators. Now the Control Module is ready to latch with the Disposable Cartridge.

3. Latch the Disposable Cartridge to the Control Module by aligning the lot number label with the center of the user interface label and then pushing down firmly. The Cartridge clips will audibly click when properly latched.



4. Briefly press the ON button to display a "0" in the STATUS DISPLAY window. Proceed with processing only after verifying that a "0" is displayed.

**NOTE:** The centrifuge requires at least two Control Modules with Disposable Cartridges mounted to be processed together for balance. A counterbalance can be used in lieu of a second Control Module with sample.



5. Using a digital scale, weigh and balance the Disposable Cartridge/Control Module assemblies using the balance rings to a final weight within  $\pm 2$  grams. If an odd number of units are being processed, an X-Counterbalance must be used to ensure accurate balancing of the centrifuge. Use the appropriate counterweight according to the input volume of the sample.




6. Place balance rings, if needed, on the inside the rim of the centrifuge bucket with the Disposable Cartridge/Control Module assembly.

**NOTE:** Place the X-Balance rings in the centrifuge bucket(s) prior to loading the Disposable Cartridge/Control Module pair or X-Counterweight.



## Centrifugation

 Do not exceed 2,000 RCF centrifugation at any time, as an inappropriate transfer of blood between compartments may occur, causing a loss of cell functionality and requiring the harvested cells to be discarded.


1. Carefully grasp the Disposable Cartridge/Control Module assembly with two hands and maintain a vertical alignment when lowering the assembly into the centrifuge bucket.
2. Ensure that the air vent is oriented inward, toward the rotor (center) of the centrifuge with the radial rib just left of the filter on center with the centrifuge rotor axis as shown below. The needleless port and the blue cap leading to the main chamber should be on the outer edge of the centrifuge bucket.



 Failure to properly align the Cartridge may result in unwanted fluid transfer during processing.

3. Add the X-Counterweight across from the Disposable Cartridge/Control Module assembly if processing an odd number of samples.

Input Volume (mL)	X-Counterweight
40 to 110	LOW
111 to 170	MEDIUM
171 to 240	HIGH


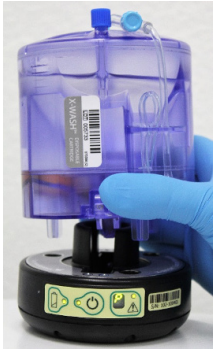
 Failure to properly balance within the centrifuge can cause centrifuge errors and/or damage to the system components.

4. Close the centrifuge lid.

5. Select the program code that represents the pre-programmed specifications that were setup on the day of install, and press the start button on the centrifuge. See Table below for program example.

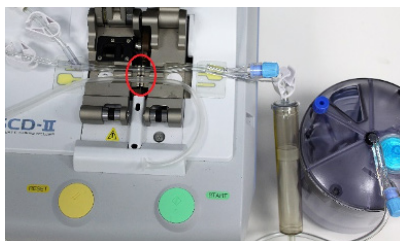
### Centrifuge Programming Example for Blood Thaw Wash Centrifugation

Example Centrifuge Program				
Program Number	Acceleration	Deceleration	RCF	Duration
1	9	9	1,000	5 minutes
2	9	9	50	2 minutes

7. Once centrifugation is complete, open the centrifuge lid, and carefully remove the Disposable Cartridge/Control Module assembly.
8. Verify that the Control Module displays a “P” (Pass) in the window. 
9. If a “P” is not displayed, do not continue the process. Refer to Troubleshooting (Chapter 10) for possible actions.
10. Examine the Disposable Cartridge for the presence of liquid in the harvest chamber, and the supernatant in the central funnel chamber.
11. If liquid is not present in any of the chambers, refer to Troubleshooting (Chapter 10) for possible actions.
12. Carefully remove the Disposable Cartridge from the Control Module by squeezing both locking tabs and lifting straight up. 

## Multiple Washes Using Corning® X-Mixer and Corning X-WASH® Accessories

1. Obtain sample bag to be processed. Attach the sample bag to the Disposable Cartridge via sterile welding to the input line above the clot filter, attaching it to the needleless port or spiking into the sample bag.



2. Open all the clamps to allow the sample to drain into the main chamber of the Disposable Cartridge.
3. If desired, wash the sample bag with media.
4. Carefully transfer the filled Disposable Cartridge to the tube sealer and seal the input line from the Disposable Cartridge directly below the clot filter, leaving as much tube length as possible. Separate and remove the tubing above the seal.

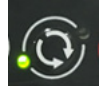


5. Attach media bag to Disposable Cartridge via sterile welding to the input line or attaching it to the needleless port. Attach clamp to media bag to prevent overflow of fluid.
6. Transport Disposable Cartridge and media bag to peristaltic pump, verify that air filter cap is removed and the media bag clamp is released, and attach air tubing from the peristaltic pump to the filter on the Disposable Cartridge lid. Make sure the air tubing does not become crimped. Make sure the Disposable Cartridge remains upright throughout this process.



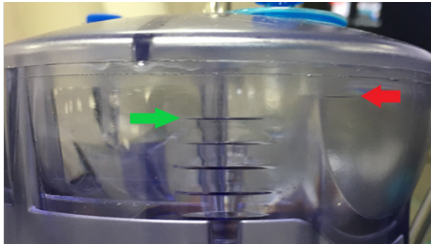
Verify that the male connector is on the right side of the pump. Incorrect orientation of air tubing can lead to improper functionality of pump.


- Verify that pump display reads 200 rpm. Press the direction button so the light on the counterclockwise arrow is illuminated.



Press the START button to apply NEGATIVE pressure to the cartridge, verifying that the START LED is illuminated, the pump activates, and the sample enters the main chamber of the Disposable Cartridge.

- Measure the estimated volume of the central chamber using the 4 lines on the side of the cartridge, filling up to 220 mL (top of 4 lines, marked with green arrow). Stop the pump when media is finished transferring into the Disposable Cartridge. Clamp input line to prevent movement of liquid between Disposable Cartridge and bag.



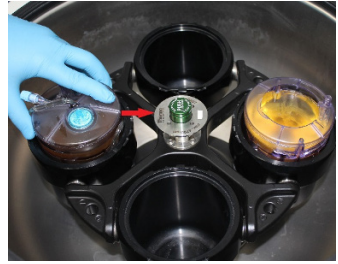
 **DO NOT EXCEED 240 mL** (line above and to the right of 3 lines, marked with red arrow).

- Seal the input line below the clot filter and attach tubing in the side pinches in the side of the cartridge as shown.
- Attach the cartridge to the Control Module. Turn on Control Module and verify that the Control Module displays a "0".



- Using a digital scale, balance the Disposable Cartridge/Control Module pair to another Disposable Cartridge/Control Module pair or X-Counterweight and X-Balance ring(s) to within 2.0 g. Select appropriate X-Counterweight based on Cartridge input volume.

12. Place the Disposable Cartridge/ Control Module and counter-balance in opposing centrifuge buckets. Ensure that the air vent is oriented inward, with the radial rib just left of the filter on center with the centrifuge rotor axis. The needleless port and the blue cap leading to the main chamber should be on the outer edge of the centrifuge bucket.



13. Close the lid and start the centrifuge.
14. Following centrifugation, verify that Control Module displays “1” or “8”, detach the Disposable Cartridge from the Control Module, and attach the waste bag to Disposable Cartridge via sterile welding to the input line (leaving the full length) or attaching it to the needleless port.

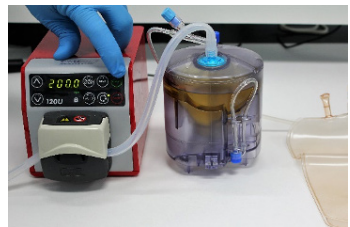


15. Transport Disposable Cartridge and waste bag to peristaltic pump, verify that air filter cap is removed, and attach air tubing from the peristaltic pump to the filter on the Disposable Cartridge lid. Make sure the air tubing does not become crimped. Make sure the Disposable Cartridge remains upright throughout this process.



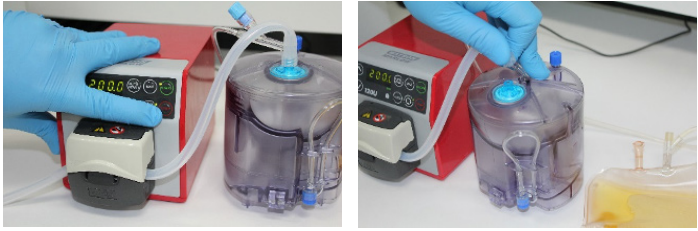
16. Verify that pump display reads 200 rpm and light on clockwise arrow is illuminated.

Press the START button to apply POSITIVE pressure to the cartridge and verify that the START LED is illuminated, the pump activates, and waste media enters the waste bag.

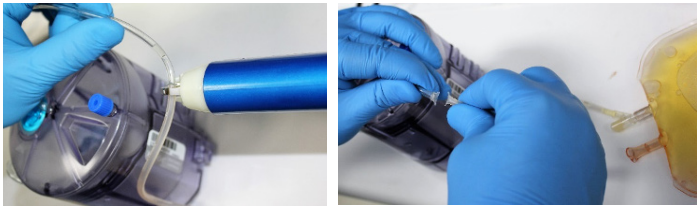




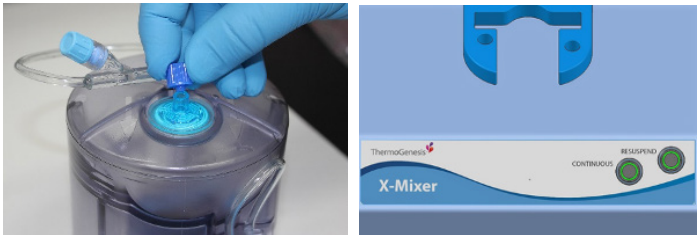
17. Stop the pump when waste is finished transferring into the waste bag or when air starts to enter the waste bag by pressing the STOP button on the pump. Clamp input line to prevent movement of liquid between Disposable Cartridge and bag. Detach air tubing from the Disposable Cartridge.



18. Detach waste bag by tube sealing the input line near the weld or removing the bag from the needleless port.

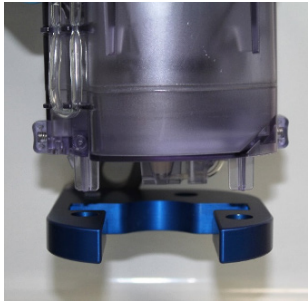


19. Return the cap to the Disposable Cartridge air filter and ensure that X-Mixer Disposable Cartridge holder is horizontal as shown in the image below. Return Disposable Cartridge tubing to the side pinches.

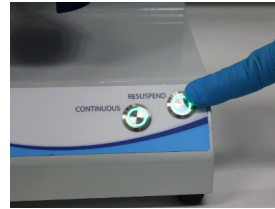




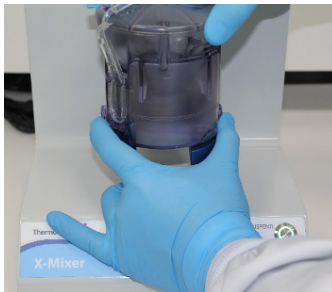
20. Latch the Disposable Cartridge onto the Disposable Cartridge holder by aligning the Disposable Cartridge feet with the holes on the holder and pressing down firmly on the Disposable Cartridge until it clicks in. Pull up on the cartridge to make sure it is completely attached. Adjust if needed.



21. Press the “Resuspend” button on the X-Mixer to resuspend the cell pellet in the main chamber of the Disposable Cartridge.

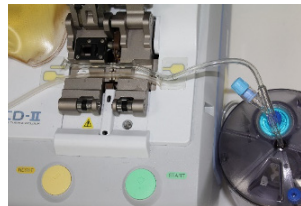


22. Detach Disposable Cartridge from Disposable Cartridge holder once resuspension cycle is complete.



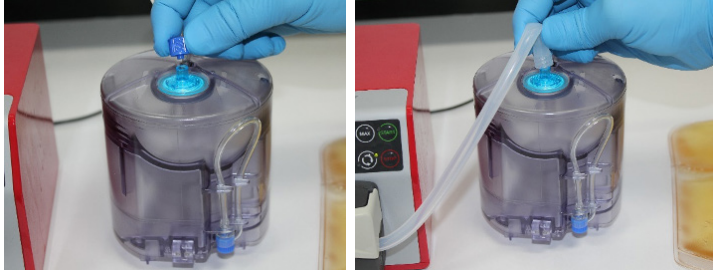
23. Attach media bag to Disposable Cartridge via sterile welding to the input line or attaching it to the needleless port.

24. Transport Disposable Cartridge and media bag to peristaltic pump, verify that air filter cap is



removed, and attach air tubing from the peristaltic pump to the filter on the Disposable Cartridge lid. Make sure the air tubing does not become crimped. Make sure the Disposable Cartridge remains upright throughout this process.

25. Verify that pump display reads 200 rpm. Press the direction button so



the light on the counterclockwise arrow is illuminated.




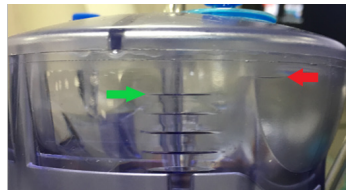
Press the START button to apply NEGATIVE pressure to the Disposable Cartridge, verifying that that the START LED is illuminated, the pump activates, and media enters the main chamber of the Disposable Cartridge.



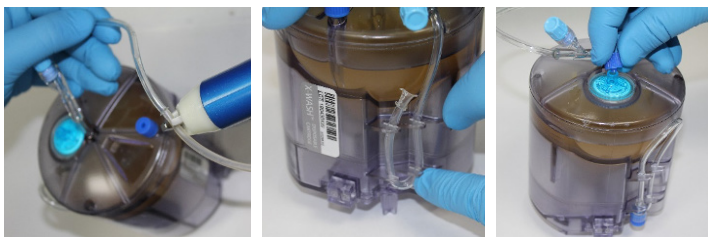
26. Measure the estimated volume of the central chamber using the 4 lines on the side of the Disposable Cartridge, filling up to 220 mL (top of 4 lines, marked with green arrow). Stop the pump when media is finished transferring into the Disposable Cartridge. Clamp input line to prevent movement of liquid between Disposable Cartridge and bag. Detach air tubing from the Disposable Cartridge.



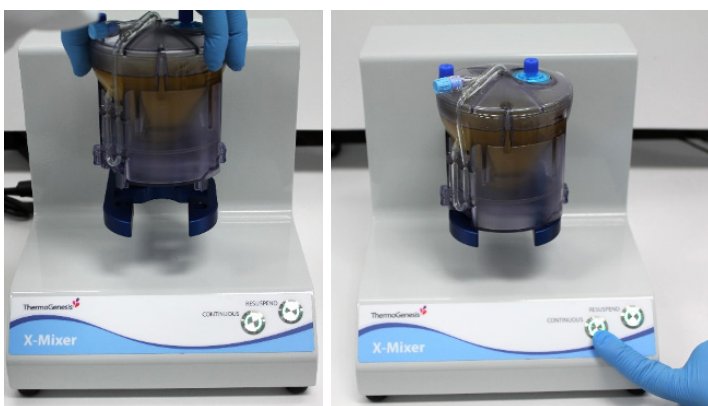
 **DO NOT EXCEED 240 mL** (line above and to the right of 3 lines, marked with red arrow).



27. Detach media bag by tube sealing the input line near the weld or removing the bag from the needleless port. Release clamp. Reinsert the tubing into the Disposable Cartridge side clips. Replace cap on air filter of Disposable Cartridge.






28. Attach the Disposable Cartridge to Disposable Cartridge holder on X-Mixer and press “Continuous” button to begin mixing cycle. Set a timer for 30 seconds. After 30 seconds, stop the X-Mixer by pressing any button. After the Disposable Cartridge has returned to the upright position and stopped moving, detach Disposable Cartridge from Disposable Cartridge holder and attach Disposable Cartridge to Control Module.





 The continuous cycle will proceed for 30 minutes if no buttons are pressed before the cycle ends.

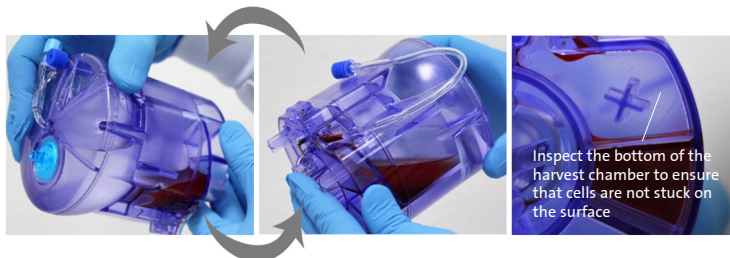
29. Using a digital scale, balance the Disposable Cartridge/Control Module pair to another Disposable Cartridge/Control Module pair or X-Counterweight and X-Balance ring(s) to within 2.0 g. Select appropriate X-Counterweight based on Cartridge input volume.
30. Place the Disposable Cartridge/Control Module and counter-balance in opposing centrifuge buckets. Ensure that the air vent is oriented inward, with the radial rib just left of the filter on center with the centrifuge rotor axis. The needleless port and the blue cap leading to the main chamber should be on the outer edge of the centrifuge bucket.
31. Close the lid and start the centrifuge

32. Repeat Steps 9-31 for any additional wash cycles.
33. Once centrifugation is complete, open the centrifuge lid and carefully remove the Disposable Cartridge/Control Module assembly.
34. Verify that the Control Module displays a “P” (Pass) in the window. 
35. If a “P” is not displayed, do not continue the process. Refer to Troubleshooting (Chapter 10) for possible actions.
36. Examine the Disposable Cartridge for the presence of liquid in the harvest chamber and supernatant in the central funnel chamber. 
37. If liquid is not present in the harvest chamber, refer to Troubleshooting (Chapter 10) for possible actions.
38. Carefully remove the Disposable Cartridge from the Control Module by squeezing both locking tabs and lifting straight up. 

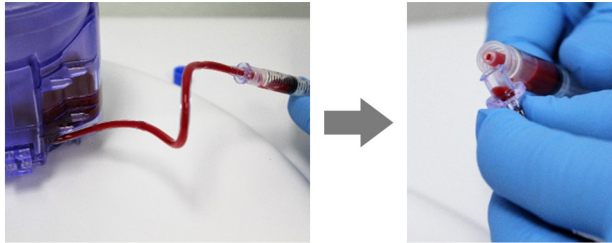
## Obtaining Harvested Cells

1. Grasp the harvest chamber access tube (located opposite of the label) and release it gently from the four clamps. 
2. Gently massage the tubing where it was clamped to ensure it is fully open.
3. Gently rock the Disposable Cartridge from side to side to resuspend cells that have sedimented at the bottom of the harvest chamber. Raise the Disposable Cartridge and visually inspect the bottom of the harvest chamber to ensure that the cells have been resuspended.

 Perform this step in a biological safety cabinet using aseptic techniques to maintain sterility.



4. Remove the cap on harvest chamber access tube and connect the syringe (for post sample harvest) to the luer adapter on the tubing. Withdraw a small sample for post-processing analysis and detach syringe.



**NOTE:** To obtain an accurate post sample, ensure that cells trapped in the tubing are moved into the harvest chamber and resuspended before taking a sample.

5. Attach another syringe to the luer adapter and carefully withdraw the cell concentrate using the syringe or sterile weld and gravity drain the sample into the collection bag. Prior to disconnecting the syringe, raise the Disposable Cartridge to ensure that there are no cells visible on the base of the harvest chamber.



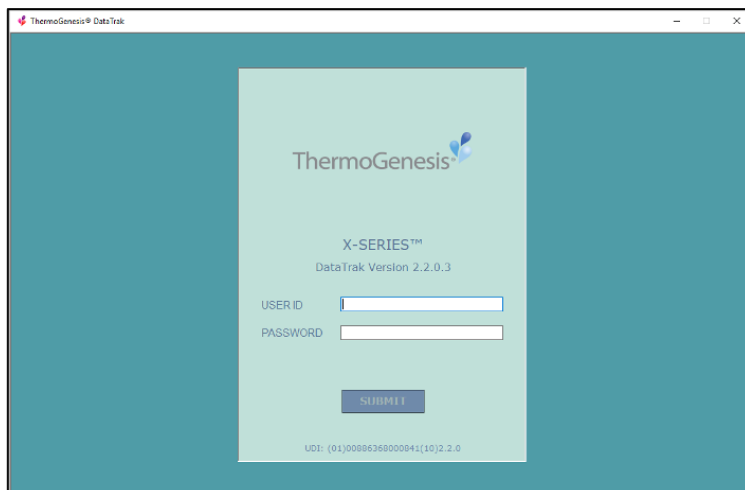
**NOTE:** For closed processing, sterile weld an optional collection bag to harvest tubing

6. Disconnect the syringe or tube seal and disconnect the sample bag. The harvested cells are now available for the next step in your process.
7. Discard the Disposable Cartridge per established procedures for handling biohazardous materials.
8. Start the computer and open the DataTrak application.



## Logging into X-SERIES® DataTrak

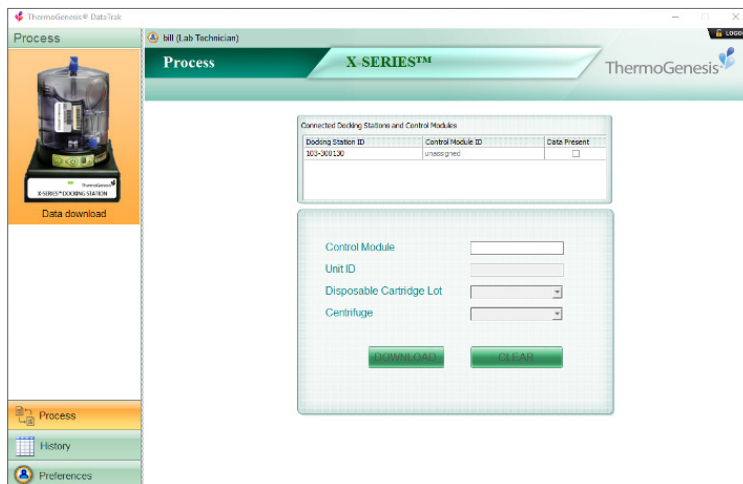
1. Double click the DATATRAK icon (🍷) located on the desktop to launch the software.



2. Enter the appropriate User ID and password.
3. Click the SUBMIT button.
4. If the User ID and/or password are entered incorrectly, an “Unknown username” and/or “Incorrect password” error will be displayed. Reenter the correct User ID and password, then click the SUBMIT button.

## Downloading Corning® X-WASH® Control Module Data

1. Verify that the Corning X-WASH Docking Station is connected to the computer via the USB cable.
2. Click on DATA DOWNLOAD on the left navigation pane.
3. Place the Control Module in the Docking Station as described in Registering and Editing a X-WASH Control Module in Chapter 7: DataTrak Administration Mode.
4. Scan the Control Module barcode or enter the Control Module serial number and UNIT ID.
5. Select the appropriate X-WASH DISPOSABLE CARTRIDGE LOT and CENTRIFUGE serial number from the dropdown menu.



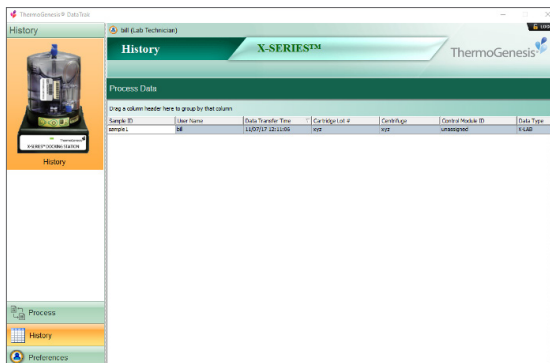
6. A green checkmark will indicate an acceptable entry. A red “X” will indicate an unacceptable entry. Verify any information associated with a red “X” and reenter as appropriate.
7. Click the DOWNLOAD button to download the data from the Control Module, or click the CLEAR button to clear the fields.

## Processing Reports

This data can be viewed in report format by accessing the report through the HISTORY section.

## Accessing the History Section

1. Click HISTORY on the lower left navigation pane.
2. Click the UNIT ID of the report to be viewed. The report is displayed in a new window.





## Adding User Notes (Optional)

1. To add comments to the report, place the cursor in the USER NOTES field.
2. Enter comment. The SAVE USER NOTE button appears after initial entry.
3. Click the SAVE USER NOTE button to retain the comment. The comment is documented with the date/time and logged-in user for each entry saved.

## Saving or Printing the File

1. To save the processing report as a PDF file, click the SAVE AS PDF button.
2. Select the file location and edit the file name as needed.
3. Click the SAVE button.
4. To print the processing report, click the PRINT button.
5. Verify the printer and click the PRINT button.

## Export

1. To export the processing report as a CSV file, click the EXPORT button
2. Select the file location and edit the file name as needed.
3. Click the SAVE button.

## Reviewing the Report

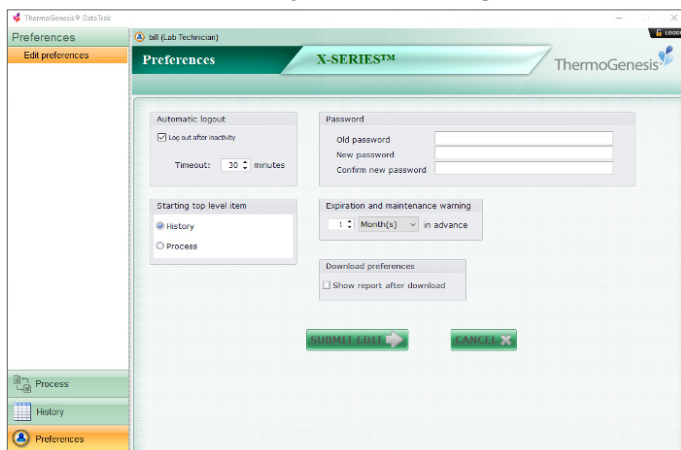
**NOTE:** Only a Lab Supervisor may add a GRAPH REVIEWED BY signature to a processing report.

1. Click the GRAPH REVIEWED BY dropdown menu and select a user name.
2. To save the processing report as a PDF file, click the SAVE AS PDF button.
3. Select the file location and edit the file name as needed.
4. Click the SAVE button.
5. To print the processing report, click the PRINT button.
6. Verify the printer and click the PRINT button.



## Logging Out and Exiting

1. To log out of the DataTrak program, select LOGOUT in the upper right corner, which will return you to the initial login screen.



2. To exit the DataTrak program, close the window by selecting the "X" in the upper right corner of the window.



# 6.0 X-SERIES® DataTrak Software: System Setup

## Corning® X-WASH® Docking Station



Handle the X-WASH Docking Station with care.

The X-WASH Control Module battery should only be charged in the X-WASH Docking Station overnight or for at least 6 hours prior to initial use.

1. Place the Docking Station upright on a flat surface to the host computer with DataTrak Software.
2. Plug the USB cable into the USB port of the Docking Station and the USB port of the host computer.
3. Plug power cord into Docking Station and then into the appropriate electrical outlet.
4. Verify that the POWER STATUS INDICATOR is lit and red, then place a Control Module on the Docking Station. The Power Status Indicator will turn green upon successful connection between the Docking Station and the Control Module.

## Corning X-WASH Control Module

1. Place the Control Module onto a Docking Station that is plugged into an electrical outlet.
2. Verify that the Docking Station POWER STATUS INDICATOR is green.
3. Leave the Control Module charging in the Docking Station until the Control Module BATTERY STATUS INDICATOR remains green without blinking.

## X-SERIES DataTrak Software



Ensure that the computer is virus-free and has the latest update of the anti-virus software prior to DataTrak Software installation

Update the operating system, service pack, and anti-virus software on a regular basis

Do not leave an internet connection active while installing or using the DataTrak Software.

1. Verify that the computer meets DataTrak Software requirements (See Section on Computer System Requirements in Chapter 12 Specifications)
2. Verify that all system updates have been completed.

3. Ensure that administrator access is available. The software will be installed by a Corning technical representative.
4. The users, components of the X-WASH System, and the centrifuges must be entered into the software before processing data can be downloaded. To prepare the software, follow the directions described in DataTrak Administration Mode in Chapter 7 .
5. If not already completed, attach the associated X-WASH System components (i.e., the Docking Station) to the host computer via the USB ports or hub.

### Initial Login

The DataTrak Software is programmed with a default name and password for the Administrator profile and default passwords for Lab Supervisor and Lab Technician profiles to allow initial access to the software. The first login will require the default name and password for Administrators and the default password for Lab Supervisors and Lab Technicians.

User Profile	User Id	Password
Administrator	Admin	Admin-1
Lab Supervisor	Assigned by Administrator	Supervisor-1
Lab Technician	Assigned by Administrator	Technician-1

**NOTE:** User names and passwords are case sensitive.

1. Launch DataTrak Software by double clicking the icon located on the desktop.
2. In the USER ID and password fields, enter the User ID: “Admin” and default password, “Admin-1”.
3. Click the SUBMIT button.
4. If the User ID and/or password is entered incorrectly, an “Unknown username” or “Incorrect password” error will be displayed. Reenter the correct User ID and password, then click the SUBMIT button.
5. The password should be changed once initial login is accomplished. Refer to the SETTING PREFERENCES section in Chapter 8 to change the password.
6. A new user must be set up as a Lab Supervisor or Lab Technician in order to be able to access the OPERATIONS mode of the software.

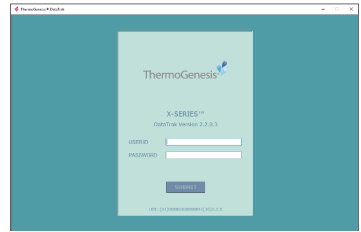


# 7.0 X-SERIES® DataTrak Administration Mode

Only users with Administrator roles can access the software's administration mode. Verify all data entries prior to submitting, as they cannot be edited once accepted by the software.

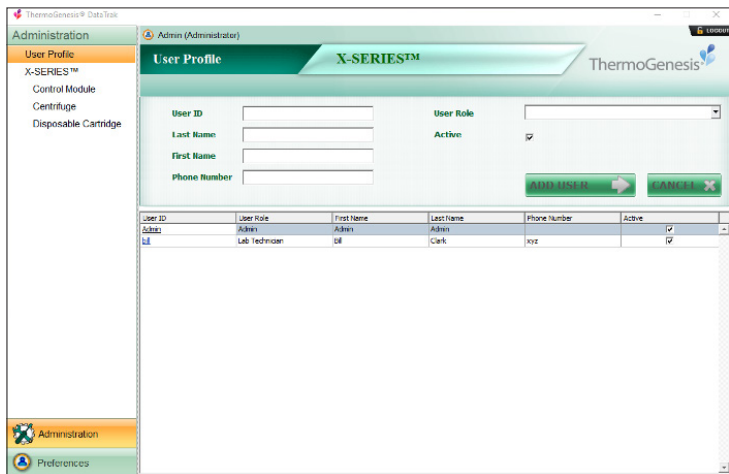
## Software Login

1. Double click the DataTrak icon located on the desktop to launch the software.
2. Enter Administrator User ID and the associated password, then click the SUBMIT button.
3. If the User ID is entered incorrectly, an "Invalid User ID" error will be displayed. If the password is entered incorrectly, an "Incorrect password" error will be displayed. Reenter the correct User ID and password, then click the SUBMIT button.



## Adding and Editing a User

1. Verify that the USER PROFILE section on the left pane is highlighted. Enter the appropriate information into the USER PROFILE fields.
2. Select the applicable user profile using the dropdown menu.



3. Verify that the ACTIVE checkbox is checked.
4. Click the ADD USER button to enter the user or the CANCEL button to clear the information.

5. A successful entry will display “User saved successfully”.
6. New users will be required to log in the first time using the default password. The password may be changed in the PREFERENCES section of the software after initial login.
7. To edit a user profile, click the appropriate name under the USER ID column.
8. The corresponding information will appear in the entry fields and can be edited, except for the User ID.
9. Unchecking the ACTIVE checkbox will inactivate the user. Inactive users will be unable to log in to the DataTrak Software.
10. To save changes, click the SUBMIT EDIT button. To cancel all changes made, click the CANCEL button.

### **Resetting a Password**

1. Only default passwords are stored. To reset a password, click the appropriate name under the USER ID column.
2. Click the RESET PASSWORD checkbox.
3. Click the SUBMIT EDIT button to reset the password to the default setting, or click the cancel button to cancel the edit.

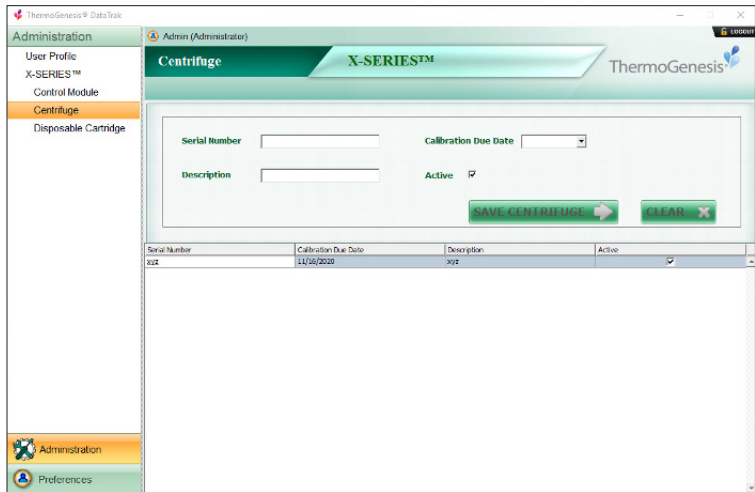
### **Registering and Editing a Corning® X-WASH® Control Module**

1. Place an unregistered X-WASH Control Module in an X-WASH Docking Station that is connected to the computer.
2. Click CONTROL MODULE on the left navigation pane.
3. Click the REGISTER CONTROL MODULE button.
4. The REGISTER CONTROL MODULE window will appear. Scan or type the serial number of the Control Module and select the received date from the dropdown menu. The default will be the current date.
5. Click the REGISTER button to register the Control Module. Click the CANCEL button to exit without registering.
6. Verify that the Control Module information is displayed in the table.
7. To inactivate a Control Module, click the ID of the appropriate Control Module in the table.
8. The Control Module edit fields will appear. Only the ACTIVE STATUS and the LAST MAINTENANCE fields may be edited.
9. Click the ACTIVE checkbox to uncheck. Inactive Control Modules will be not recognized for data download.
10. Click the SUBMIT EDIT button to inactivate or click the CANCEL button to cancel the edit.

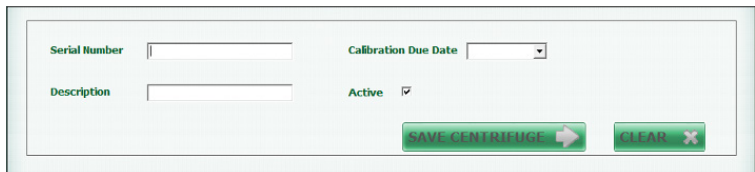
11. To return a Control Module into use after maintenance, click the ID of the appropriate Control Module in the table.
12. Click the ACTIVE checkbox and then select the CALIBRATION DUE DATE from the dropdown menu.
13. Click the SUBMIT EDIT button to activate the Control Module, or click the CANCEL button to cancel the edit.

## Adding and Inactivating a Centrifuge

1. Click CENTRIFUGE on the left navigation pane.



2. Enter the SERIAL NUMBER and DESCRIPTION (optional).



3. Select the CALIBRATION DUE DATE from the dropdown menu.
4. The software will not accept calibration due dates from the past.
5. The ACTIVE button default is checked, to inactivate, click the ACTIVE checkbox.
6. Click the SAVE CENTRIFUGE button to save the centrifuge information, or the CLEAR button to clear the entry.
7. Verify that the centrifuge information is displayed in the table.

8. To make the centrifuge inactive, click the appropriate SERIAL NUMBER of the centrifuge in the table.
9. Click the ACTIVE checkbox to uncheck. Inactive centrifuges will not appear in the download dropdown menu option.
10. To save the change, click the SAVE CENTRIFUGE button or click the CLEAR button to clear the change.

## Adding and Editing a Corning® X-WASH® Disposable Cartridge Lot

1. Click DISPOSABLE CARTRIDGE on the left navigation pane.

The screenshot shows the 'Disposable Cartridge' management interface. The form contains the following fields:

- Lot #
- Quantity
- Active (checkbox, currently checked)
- Expiration Date (yyyy-mm)
- Date Received (dropdown menu)

Buttons for 'SAVE CARTRIDGE' and 'CLEAR' are visible. Below the form is a table with the following data:

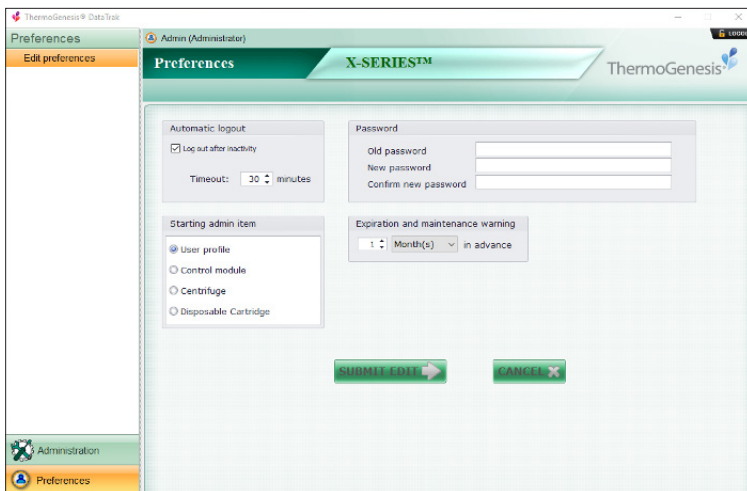
Lot #	Expiration Date	Date Received	Quantity	Active
102	11/1/2020	11/1/2017	1	<input checked="" type="checkbox"/>
103	11/1/2020	11/1/2017	1	<input checked="" type="checkbox"/>

2. Enter the LOT #, QUANTITY, ACTIVE STATUS, and EXPIRATION DATE (in the format yyyy-mm) fields, and select the DATE RECEIVED from the dropdown menu.
3. The software will not accept an EXPIRATION DATE from the past or a DATE RECEIVED from the future. An expired lot will not be available for download and will not appear in the DOWNLOAD dropdown menu.
4. Click the SAVE CARTRIDGE button to save the Disposable Cartridge information, or click the CLEAR button to clear the entry.
5. Verify that the Disposable Cartridge information is displayed in the table.
6. Only the quantity and active status may be edited once the Disposable Cartridge information has been entered. Click the appropriate lot number to display the edit fields.
7. Unchecking the ACTIVE checkbox will inactivate the lot number. Inactive lot numbers will not appear in the DOWNLOAD dropdown menu option.

8. Enter the quantity in the QUANTITY field as applicable.
9. To save changes, click the SAVE CARTRIDGE button, or to clear all changes made, click the CLEAR button.

## Editing Preferences

1. Click the PREFERENCES button on the lower left navigation pane.
2. The PREFERENCES window will appear.

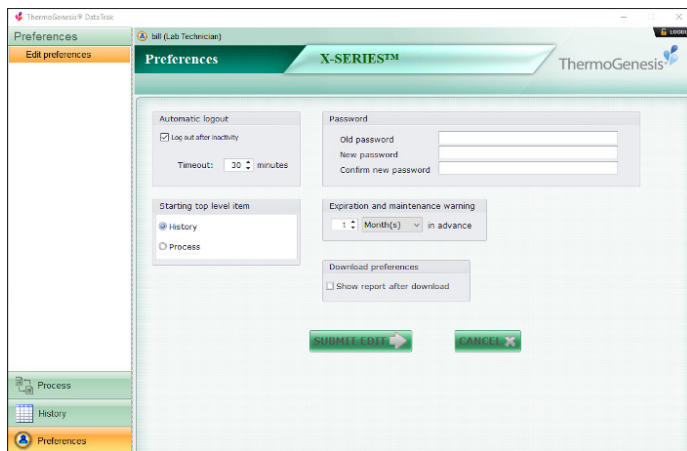


3. To log out automatically when inactive, click the AUTOMATIC LOGOUT checkbox, and select the appropriate time in minutes from the dropdown menu.
4. To set the desired starting admin, select the STARTING ADMIN ITEM from the options displayed. The selected item will automatically appear after login.
5. To set an expiration warning, use the EXPIRATION AND MAINTENANCE WARNING up/down keys and the dropdown menu to set the desired number of days, weeks, or months in advance the warning will be displayed.
6. To edit a password, enter the current password, the new password, and confirm the new password by reentry. The password must be between 8 and 20 characters and must include one number and one punctuation character.
7. Click the SUBMIT EDIT button to save the changes or the CANCEL button to cancel all changes made.



## Exiting Administration Mode

1. To exit the DataTrak System ADMINISTRATION mode, click the LOGOUT icon in the upper right corner to return you to the initial login screen.



2. To exit the software completely, click the “X” in the upper right section of the window.



## 8.0 X-SERIES® DataTrak Operations Mode

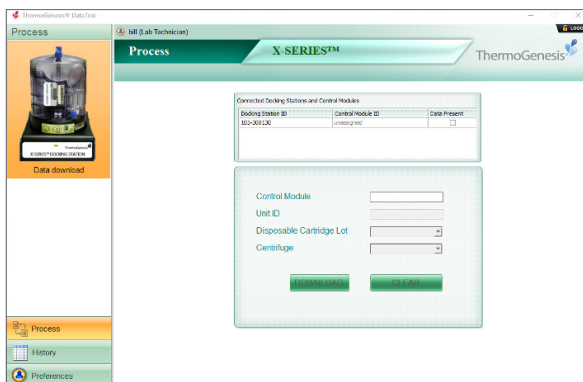
### Logging In

1. Double click the DATATRAK icon located on the desktop to launch the software.
2. Enter the appropriate User ID and password.
3. Click the SUBMIT button.
4. If the User ID and/or password are entered incorrectly, an “Unknown username” and/or “Incorrect password” error will be displayed. Re-enter the correct User ID and password, then click the SUBMIT button.



### Downloading Corning® X-WASH® Control Module Data

1. Verify that the X-WASH Docking Station is connected to the computer via the USB cable.
2. Click on DATA DOWNLOAD on the left navigation pane.
3. Place the Control Module in the Docking Station.
4. Scan the Control Module barcode or enter the Control Module serial number and UNIT ID.
5. Select the appropriate X-WASH DISPOSABLE CARTRIDGE LOT and CENTRIFUGE serial number from the dropdown menu.
6. A green checkmark will indicate an acceptable entry. A red “X” will indicate an unacceptable entry. Verify any information associated with a red “X” and reenter as appropriate.
7. Click the DOWNLOAD button to download the data located on the Control Module, or click the CLEAR button to clear the fields.

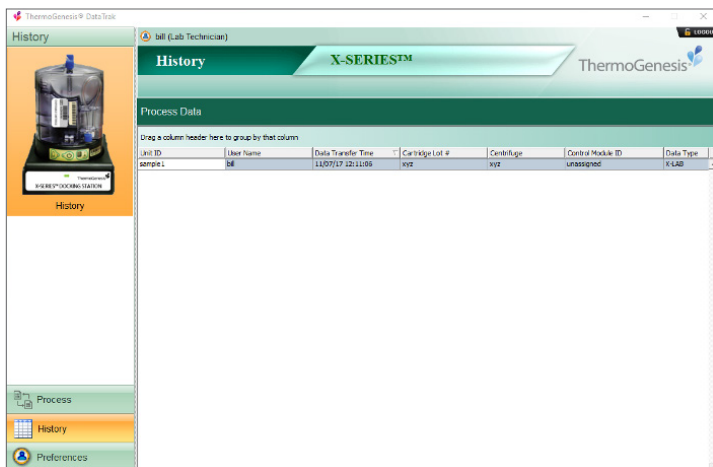


## Processing Reports

Data collected by the Control Module is downloaded into the DataTrak Software. This data can be viewed in report format by accessing the report through the HISTORY section.

### Accessing the History Section

1. Click HISTORY on the lower left navigation pane.
2. Click the UNIT ID of the report to be viewed. The report is displayed in a new window.



### Launch Report on Download

1. Click the PREFERENCES section on the lower left navigation pane.
2. Check the checkbox next to SHOW REPORT AFTER DOWNLOAD under the download preferences area.
3. Click the SUBMIT EDIT button to save the change.
4. The report will now be displayed automatically after each download.

### Adding User Notes (Optional)

1. To add comments to the report, place the cursor in the USER NOTES field.
2. Enter comment. The SAVE USER NOTE button appears after initial entry.
3. Click the SAVE USER NOTE button to retain the comment. The comment is documented with the date/time and logged-in user for each entry saved.

## Saving or Printing the File

1. To save the processing report as a PDF file, click the SAVE AS PDF button.
2. Select the file location and edit the file name as needed.
3. Click the SAVE button.
4. To print the processing report, click the PRINT button.
5. Verify the printer and click the PRINT button.

## Export

1. To export the processing report as a CSV file, click the EXPORT button.
2. Select the file location and edit the file name as needed.
3. Click the SAVE button.

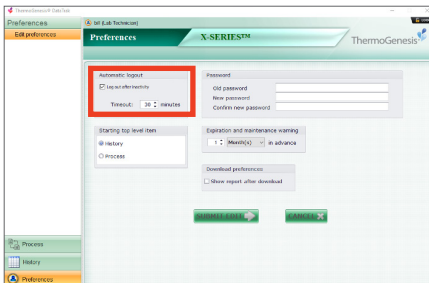
## Reviewing the Report

**NOTE:** Only a Lab Supervisor may add a GRAPH REVIEWED BY signature to a processing report.

1. Click the graph reviewed by dropdown menu and select a user name.
2. To save the processing report as a PDF file, click the SAVE AS PDF button.
3. Select the file location and edit the file name as needed.
4. Click the SAVE button.
5. To print the processing report, click the PRINT button.
6. Verify the printer and click the PRINT button.

## Setting Preferences

1. Click the PREFERENCES section on the lower left navigation pane
2. The PREFERENCES window will appear.
3. To log out automatically when inactive, click the AUTOMATIC LOGOUT checkbox and select the appropriate time in minutes from the dropdown menu.



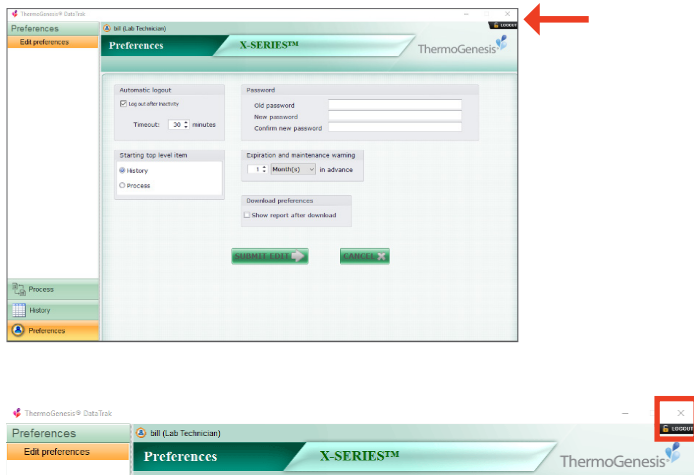
- To set the desired starting top-level item, select the STARTING TOP LEVEL ITEM from the options displayed. The selection will automatically appear upon after logging into the software.
- Click the SHOW REPORT AFTER DOWNLOAD checkbox to either enable or disable.
- To edit a password, enter the current password, the new password and confirm the new password by re-entry. The password must be between 8 and 20 characters and must include one number and one punctuation character.

**NOTE:** Password must be between 8 and 20 characters and must include one number and one punctuation character.

- To set an expiration warning, use the EXPIRATION AND MAINTENANCE WARNING up/down keys and the dropdown menu to set the desired number of days, weeks, or months in advance the warning will be displayed.
- Click the SUBMIT EDIT button to save the changes, or click the CANCEL button to cancel all changes made.

## Logging Out and Exiting

- To log out of the DataTrak program, select LOGOUT in the upper right corner, which will return you to the initial login screen.
- To exit the DataTrak program, close the window by selecting the “X” in the upper right corner of the window.



## 9.0 Maintenance, Cleaning, and Disinfection



Always follow established procedures for handling and discarding biohazardous materials.



Prior to cleaning, power down the Corning® X-WASH® Control Module and unplug the X-WASH Docking Station.

Any electromechanical device disposal must follow local regulations.

If an error code is experienced, first consult Troubleshooting (Chapter 10) of this manual. If the problem persists, call Corning Scientific Support at 800.492.1110, +1.978.442.2200 (USA/Canada) or contact your local Corning sales office, or send an email to **ScientificSupport@corning.com**.

For cleaning, use a dry cloth or paper towel to wipe away any cell solution or other fluid that has not yet dried.

For disinfection, wet a paper towel with a 10% bleach solution or a 70% isopropyl alcohol solution, and wipe down all outside surfaces, taking care not to allow cleaning solution to enter the Control Module. Allow the wet surface to sit for 5 minutes before drying.

## 10.0 Troubleshooting

The Troubleshooting section will describe appropriate steps to take in the event that a processing run did not perform as intended.

### Corning® X-WASH® Disposable Cartridge Visual Inspection

The X-WASH Disposable Cartridge has been designed to be optically clear and provide excellent viewing of the separated liquid fractions in each of the two compartments described below:

- **Central Funnel Compartment:** Center compartment that will contain the plasma fraction.
- **Harvest Compartment:** Side compartment opposite the lot number label that will contain the harvest fraction.

If liquid is not present in both chambers, determine if there are displayed errors on the X-WASH Control Module or error messages on the Processing Report from the X-SERIES DataTrak Software. Follow instructions under User Action for the indicated error or message.



In the event that liquids enter the X-WASH Control Module, contact Corning Scientific Support for assistance.

### Corning X-WASH Control Module Alerts and Error Codes

The table below identifies the displayed alerts and error codes for the Control Module and appropriate user actions.

Displayed Character	Error Description	User Action
bL	Battery low. There is insufficient power for a centrifugation process.	Charge the Corning X-WASH Control Module.
Blank (no display)	Process error.	Review the X-SERIES® DataTrak Processing Report for the error message and appropriate user actions.
CF	Cam failure. The Corning X-WASH Control Module self-test has determined that the cam has failed to reset to starting position.	Do not use the Control Module for processing. Contact Corning Scientific Support for assistance.
Cr	Calibration required. The Control Module needs to be calibrated to manufacturer's specifications before it can be used for the centrifugation process.	Do not use the Control Module for processing. Contact Corning Scientific Support for assistance.
dP	Data Present. The data was not downloaded from the Control Module before powering down.	Download the data from the Control Module.
F	Fail. The stratification, depletion, or harvest cycles have failed to complete.	Review the DataTrak Processing Report for the error message and appropriate user actions.

## X-SERIES® DataTrak Software Download Error Message

The table below identifies the errors displayed on the Processing Report and appropriate user actions.

Error Message	Description	Action by User
<b>Depletion valve open failed</b>	The RBC pinch valve has failed to open when directed.	Place the same loaded Corning® X-WASH® Disposable Cartridge on a new Corning X-WASH Control Module and repeat the run. Contact Corning Scientific Support for assistance.
<b>Harvest valve open failed</b>	The harvest pinch valve failed to open when directed and the MNC harvest did not take place.	Place the same loaded Disposable Cartridge on a new Control Module and repeat the run. Contact Corning Scientific Support for assistance.
<b>Harvest valve close failed</b>	The harvest pinch valve failed to close when directed. The target volume of harvested cells will be exceeded.	The harvested cells should be obtained as intended. The pinch valve will automatically close when the Disposable Cartridge is removed from the Control Module. Contact Corning Scientific Support for assistance.
<b>Accelerometer Timeout</b>	The accelerometer failed to update the processor at the start of the centrifugation process so no cells were depleted or harvested.	Place the same loaded Disposable Cartridge on a new Control Module and repeat the run. Contact Corning Scientific Support for assistance.
<b>Harvest Timeout</b>	The harvest pinch valve failed to close when directed. The target volume of harvested cells will be exceeded.	The harvested cells should be obtained as intended. The pinch valve will automatically close when the Disposable Cartridge is removed from the Control Module. Contact Corning Scientific Support for assistance.
<b>Dock Abort</b>	The Corning X-WASH Control Module was placed onto a Docking Station before the process could complete.	Place the same loaded Disposable Cartridge on a new Control Module and repeat the run.
<b>Valve acceleration exceeded</b>	The depletion took longer than expected, due to a possible obstruction in the transfer tubing. Transfer was not complete when the MNC harvest began and the centrifuge accelerated to 2000 RCF. The g-force may be sufficient to dislodge the obstruction and allow high velocity passage of the cells.	Discard the sample, as cell quality may be affected. Contact Corning Scientific Support and report the issue.
<b>Valve battery threshold</b>	Battery did not have sufficient charge to rotate cam.	Place the same loaded Disposable Cartridge on a new Control Module and repeat the run. Charge the Control Module.
<b>Out of FRAM</b>	Control Module ran out of memory to record processing data.	Verify the centrifuge cycle times are set properly. Contact Corning Scientific Support for further troubleshooting.



## Hidden Keystrokes

- To view latest log file, press: Ctrl-Shift-Alt-V and a window will pop up.
- To save all log files in a zip, press: Ctrl-Shift-Alt-Z and save file.

## Sample Retrieval from the Corning® X-WASH® Disposable Cartridge

This section describes the steps to perform in the event that the separated components need to be removed from the individual Disposable Cartridge compartments for either reprocessing or sample analysis.

### Obtaining a Sample from the Central Funnel Chamber

Remove the cap from the sample inlet port of the Disposable Cartridge and attach a syringe. Carefully withdraw the plasma sample. Tilt the Disposable Cartridge as needed to ensure that all of the plasma is withdrawn.


## 11.0 Technical Support

All Corning® X-WASH® Systems purchased will be supplied with a copy of the X-WASH System Instruction Manual. In addition, Corning technical staff will provide end-user training prior to the system's use and will be available for specific questions or clarifications.

For assistance with technical or application issues, contact Corning Scientific Support at (USA/Canada) 800.492.1110, +1.978.442.2200, or email [ScientificSupport@corning.com](mailto:ScientificSupport@corning.com). Outside the U.S. contact your local Corning sales office.

## 12.0 Specifications

### Corning® X-WASH® Disposable Cartridges

Feature	Specification
Capacity	40 mL to 240 mL
Height	5.0 inches (12.7 cm)
Diameter	3.9 inches (9.91 cm)
Weight (empty)	0.51 lbs. (0.23 kg)
Sterilization method by manufacturer	Gamma Irradiation
Single-use only 	The Corning X-WASH Disposable Cartridge is a single-use device with a sterile, non-pyrogenic fluid path. Do not use if packaging or product is damaged. Do not re-sterilize.

Operating Environment	Specification
Operating Temperature	10°C ≤ Operating Temperature ≤35°C
Operating Pressure	70 kPa ≤ Operating Pressure ≤106 kPa (526.3 mmHG ≤ Operating Pressure ≤797 mmHG)
Relative Humidity	10% ≤ Operating/Storage Humidity ≤95%

Storage and Transport Environment	Specification
Storage Temperature	7°C ≤ Storage and Transport Temperature ≤50°C
Storage Pressure	50 kPa ≤ Storage and Transport Pressure ≤106 kPa (376 mmHG ≤ Operating Pressure ≤797 mmHG)
Storage Humidity	10% ≤ Operating/Storage and Transport Humidity ≤95%

## Corning® X-WASH® Control Module

Feature	Specification
Height	2.3 in. (5.8 cm)
Diameter	3.92 in. (9.96 cm)
Weight	0.66 lbs. (0.3 kg)
Battery Voltage	3.7 volt nominal
Battery Pack	Lithium ion, rechargeable

Control Module Power Input	Specification
DC Voltage	5V
Current	900 mA

Operating Environment	Specification
Operating Temperature	10°C ≤ Operating Temperature ≤ 35°C
Operating Pressure	70 kPa ≤ Operating Pressure ≤ 106 kPa (526.3 mmHG ≤ Operating Pressure ≤ 797 mmHG)
Relative Humidity	10% ≤ Operating/Storage Humidity ≤ 95%
Centrifugation Speed	Nominal 50 to 2,000 RCF

Storage and Transport Environment	Specification
Storage Temperature	-20°C ≤ Storage and Transport Temperature ≤ 70°C
Storage Pressure	50 kPa ≤ Storage and Transport Pressure ≤ 106 kPa (376 mmHG ≤ Operating Pressure ≤ 797 mmHG)
Storage Humidity	10% ≤ Operating/Storage and Transport Humidity ≤ 95%

## Corning® X-Mixer®

Feature	Specification
Height	9 inches (22.86 cm)
Width	9 inches (22.86 cm)
Depth	10 inches (25.40 cm)
Weight	13.5 lbs. (6.12 kg)

Corning X-Mixer Power Supply	Specification
Power Supply	Digi-Key 271-2891-ND
DC Output Voltage	12V
DC Output Current	5A
AC Input Voltage	90-264 VAC
Frequency	50/60 Hz
Power Consumption	1.83A

Operating Environment	Specification
Operating Temperature	10°C ≤ Operating Temperature ≤ 35°C
Operating Pressure	70 kPa ≤ Operating Pressure ≤ 106 kPa (526.3 mmHG ≤ Operating Pressure ≤ 797 mmHG)
Relative Humidity	10% ≤ Operating/Storage Humidity ≤ 95%

Storage and Transport Environment	Specification
Storage Temperature	-20°C ≤ Storage and Transport Temperature ≤ 70°C
Storage Pressure	50 kPa ≤ Storage and Transport Pressure ≤ 106 kPa (376 mmHG ≤ Operating Pressure ≤ 797 mmHG)
Relative Humidity	10% ≤ Operating/Storage Humidity ≤ 95%

## Corning® X-WASH® Docking Station

Feature	Specification
Height	1.9 in. (4.93 cm)
Width	5.3 in. (13.5 cm)
Depth	5.2 in. (13.2 cm)
Weight	2.2 lbs. (1.01 kg)

Docking Station Power Input	Specification
DC Input Voltage	5V
DC Input Current	4.0A (≤4 Docking Stations connected in series)

Docking Station Power Supply	Specification
Power Supply	PMP31-10-B7
DC Output Voltage	5V
DC Output Current	5A
AC Input Voltage	100-240 VAC
Frequency	50/60 Hz
Power Consumption	1.0 to 0.6A

Operating Environment	Specification
Operating Temperature	10°C ≤ Operating Temperature ≤35°C
Storage Pressure	70 kPA ≤ Storage and Transport Pressure ≤106 kPA (526.3 mmHG ≤ Operating Pressure ≤797 mmHG)
Relative Humidity	10% ≤ Operating/Storage and Transport Humidity ≤95%

Storage and Transport Environment	Specification
Storage Temperature	7°C ≤ Storage and Transport Temperature ≤50°C
Storage Pressure	50 kPA ≤ Storage and Transport Pressure ≤106 kPA (376 mmHG ≤ Operating Pressure ≤797 mmHG)
Storage Humidity	10% ≤ Operating/Storage and Transport Humidity ≤5%

## X-SERIES® DataTrak Software

### Computer System Requirements

A computer, printer, USB hub, and barcode scanner are not provided with the software. A Corning representative will install and configure the software application for customer use.

The **minimum** required computer specifications are:

- Windows® 7 or 10 Operating System
- Microsoft® .Net Framework 4.0
- Minimum 2.7 GHz Intel® Pentium processor or equivalent
- Minimum 2 GB RAM of memory
- Minimum Hard disk free space of 100 GB\* dedicated to the DataTrak database
- Minimum (1) USB 2.0 port

The **recommended** required computer specifications are:

- Minimum 8 GB RAM of memory
- Minimum Hard disk free space of 200 GB\* dedicated to the DataTrak database
- At least 2 available USB port with one used with a barcode scanner

\*All data captured by X-SERIES DataTrak Software is stored within a database. The storage size requirements for this database are dependent on the number of samples run in a year.

### Guidelines for Annual Requirements of Data Storage

Number of Processes (Samples) Run in 1 Year	Estimated Storage Required 1 Year of Data	Estimated Storage Required for 5 Years of Data
2,500	2 GB	10 GB
10,000	8 GB	40 GB
25,000	18 GB	90 GB
50,000	35 GB	175 GB

## Centrifuge

To ensure proper operation of the Corning® X-WASH® System, the Thermo Scientific Sorvall™ Legend™ XT or XTR, or the Hettich ROTANTA 460 centrifuge is necessary, therefore it is important to be able to order the correct centrifuge.

### Ordering Information

There are three components that must be ordered to have a complete system:

- Centrifuge
- Rotor
- Buckets

### *Thermo Scientific™ Sorvall™ Legend™ XT or XTR*

There are several options for the Legend tabletop centrifuge, including whether the centrifuge is refrigerated (XTR) or not (XT):

Voltage	Thermo Scientific Non-Refrigerated System Cat. No.	Thermo Scientific Refrigerated System Cat. No.
100V, 50/60 Hz	75-004-507	75-004-522
120V, 60 Hz	75-004-506	75-004-521
230V (US and Canada)*	75-004-508	75-004-523
230V, 50 Hz	75-004-505	75-004-520

\*Includes a NEMA Plug 6-15

The Corning X-WASH Disposable Cartridges use a single rotor and bucket set. One of each of these parts numbers is required for centrifuge operation:

Thermo Scientific Cat. No.	Description
75-003-180	TX-750 Rotor cross
75-003-608	TX-750 Round buckets (set of 4)

The centrifuge should be calibrated annually.

Follow Thermo Scientific Instruction Manuals for setup and operation of the centrifuge, rotor, and buckets.

### **Hettich ROTANTA 460**

There are several options for the ROTANTA tabletop centrifuge, including whether the centrifuge is refrigerated (460R) or not (460):

Voltage	Hettich Non-Refrigerated System Cat. No.	Hettich Refrigerated System Cat. No.
100 - 120V, 50/60 Hz	5650-01	5660-01
200 - 240V, 50/60 Hz	5650	N/A
200 - 240V, 50 Hz	N/A	5660

There are several options for the ROTANTA floor-standing centrifuge (460RC or 460RF):

Voltage	Hettich Refrigerated System Cat. No.
100V, 50 Hz	5675-01
100 - 120V, 60 Hz	5675
200 - 240V, 50 Hz	5670

The Corning® X-WASH® System Disposable Cartridges use a single rotor and bucket set. One of each of these parts numbers is required for centrifuge operation:

Hettich Cat. No.	Description
5699-R	Rotor
4880	Round Buckets (set of 4)

For proper function, the centrifuge should be calibrated annually.

Follow the Hettich Instruction Manuals for setup.

### **Tube Sealer**

To ensure proper operation of the Corning X-WASH System, the Genesis BPS Rapid Seal II™ SE540 tube sealer is necessary, therefore it is important to be able to order the correct tube sealer.

### **Ordering Information**

Genesis BPS Cat. No.	Description
428-SE540	Space-saving benchtop sealer

Follow the Genesis BPS Manuals for setup and operation of the tube sealer.

## 13.0 Product Disposal



According to Directive 2012/19/EU of the European Parliament and Council of 4th July 2012 on waste and electronic equipment (WEEE) as amended, the Corning® X-WASH® Control Module and Docking Station are marked with the crossed-out wheeled bin and must not be disposed of with domestic waste.

Consequently, the buyer shall follow the instructions for reuse and recycling of waste electronic and electrical equipment (WEEE) provided with the products and available at [www.corning.com/weee](http://www.corning.com/weee).

For more specific information on claims, visit the Certificates page at [www.corning.com/lifesciences](http://www.corning.com/lifesciences).

**Warranty/Disclaimer:** Unless otherwise specified, these products are US class I medical devices and medical device accessories, as general purpose laboratory equipment labeled or promoted for a specific medical use. Corning does not make or support any further claim for these products nor does it conduct any further testing to support any other intended use for the product indicated above. Should you decide that you want to use the product for any intended use other than that made by Corning then you accept that Corning does not make or support that claim and that you as the user are responsible for any testing, validation, and/or regulatory submissions that may be required to support the safety and efficacy of your intended application.

For additional product or technical information, visit [www.corning.com/lifesciences](http://www.corning.com/lifesciences) or call 800.492.1110. Outside the United States, call +1.978.442.2200 or contact your local Corning sales office.

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