

# **WELCH**

*A Gardner Denver Product*

## **OWNER'S MANUAL FOR ASPIRATION / FILTRATION VACUUM SYSTEM MODEL: 2511**



Models 2511B-75 / 2511C-75 / 2511C-76 / 2511C-77



**Warning**  
**Not recommended for pumping acid,  
base or organic vapors or gases.**

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For outside of U.S. and Canada, contact your local  
Gardner Denver sales office, see back page

**Part No. 642781A 0510**  
**Printed in USA**

**INSTRUCTION  
WARNING AND CAUTION  
PLEASE READ BEFORE OPERATION**

While reading your manual, please pay close attention to areas labeled:  
**WARNING AND CAUTION.**  
The description of each is found below.

**WARNING**  
**Warnings are given where failure to observe instruction could result in injury or death to people.**

**CAUTION**  
**Cautions are found where failure to observe the instruction could result in damage to the equipment, associated equipment and process.**

These units confirm to the SI International system of units of measurement.

The following symbols (with recommendation of IEC1010 ) of warning will be found on the pump.



Caution - refer to accompanying documents



Caution - risk of electrical shock



Caution - hot surface



Double Insulated



OFF (Power)



ON (Power)

**WARNING**  
**Motor includes a self resetting thermal cutout and the pump could restart without actuation under fault condition.**

# TABLE OF CONTENTS

## **Section 01 - SAFETY INFORMATION**

- 1.10 Caution To Prevent Injury
- 1.20 Caution To Reduce Risk Of Electrical Shock
- 1.30 Warning To Reduce Risk Of Electrocution
- 1.40 Danger To Reduce Risk Of Explosion Or Fire

## **Section 02 - INSTALLATION**

- 2.10 Introduction
- 2.20 Unpacking
- 2.30 Pump Mounting
- 2.40 Pump Location
- 2.50 Intake And Discharge Provision
- 2.60 Electrical Power
- 2.70 Vacuum Connection
- 2.80 Vacuum Gauges
- 2.90 Traps

## **Section 03 - OPERATION**

- 3.10 Starting Procedures
- 3.20 Leak Detection
- 3.30 Operating Pressure Range
- 3.40 Shutdown Procedures

## **Section 04 - MAINTENANCE**

- 4.10 Maintenance Procedures

## **Section 05 - TROUBLESHOOTING**

- 5.10 Vacuum Problems
- 5.20 Pressure Problems
- 5.30 Trouble Shooting Guide For 2511 And 2515

## **Section 06 - SPECIFICATION**

- 6.10 Specification Table

## **Section 07 - WARRANTY**

## **Section 08 - EXPLODED VIEWS AND PARTS LIST**

- 8.10 Exploded View And Parts List For 2511B-75 / 2511C-75 / 2511C-76
- 8.11 Exploded View And Parts List For 1475K-20

## **Section 09 - KITS AND ACCESSORIES**

## SECTION 1: SAFETY INFORMATION

### 1.10 Caution: To Prevent Injury...

- 1.11 Never operate this product if it has a damaged cord or plug. If it is not working properly, has been dropped, damaged or has fallen into water, please return the product to a Welch service center for examination and repair.
- 1.12 Keep the cord away from heated surfaces. All electrical products generate heat. To avoid serious burns never touch unit during or immediately after operation.
- 1.13 Never block any air openings or place it on a soft surface where the openings may be blocked. The air openings are for ventilation of the motor inside the housing. Keep all air openings free of lint, dirt and other foreign objects.
- 1.14 Model 2511 is thermally protected and can automatically restart when the protector resets. Always disconnect power source before servicing.
- 1.15 Never drop or insert fingers or any other object into any openings.
- 1.16 Do not operate this product where oxygen is being administered.
- 1.17 Wear safety glasses and goggles when operating this product. Never point any air nozzle or air sprayer toward another person or any part of the body.
- 1.18 Use only in well ventilated areas.
- 1.19 Do not use any tools or attachments without first determining maximum air pressure for that tool or attachment. Be sure to properly identify intake and discharge before using pump. See Section 2.50.



**CAUTION**  
**Do not fill the collection jar above the safe fill level line indicated on the jar.**

### 1.20 Caution: To Reduce Risk Of Electrical Shock...

- 1.21 Do not disassemble. Disassembly or attempted repairs if accomplished incorrectly can create electrical shock hazard. Refer servicing to qualified service agencies only.
- 1.22 115V unit is supplied with a three pronged plug.  
Be sure to connect pump to a properly grounded outlet only.

### 1.30 Warning: To Reduce Risk Of Electrocution...

- 1.31 Do not use this product in or near area where it can fall or be pulled into water or other liquids.
- 1.32 Do not reach for this product if it has fallen into liquid. Unplug immediately.
- 1.33 Never operate this product outdoors in the rain or in a wet area.

### 1.40 Danger: To Reduce Risk Of Explosion or Fire...

- 1.41 Do not use this pump in or near explosive atmospheres or where aerosol (spray) products are being used.
- 1.42 Do not pump anything other than atmospheric air.
- 1.43 Do not pump combustible liquids or vapors with this product or use in or near an area where flammable or explosive liquids or vapors may exist.
- 1.44 Do not use this product near flames.



**WARNING**  
**Failure to observe the above safety precautions could result in severe bodily injury, including death in extreme cases.**

## SECTION 2: INSTALLATION

### 2.10 Introduction

**2.11** This manual has been compiled not only for the care and maintenance of the Welch Aspiration/Filtration Vacuum System now in your possession, but as a helpful reference and guide to prevent many problems which may occur if used improperly.

### 2.20 Unpacking

**2.21** Carefully remove the Aspiration/Filtration Vacuum System from the shipping case. Preserve all paperwork for future reference. If damage has occurred from shipment a claim must be filed with the carrier immediately; preserve the shipping carton for inspection by the carrier. If you are required to communicate with your dealer or Welch Vacuum, be sure to include your order numbers for quick identification. Do not return the pump to the factory without filling in the online form for a returned goods number.

### 2.30 Pump Mounting

**2.31** Rubber feet are attached to the pump. Rubber feet are excellent for applications involving a semi-flexible surface such as a bench top; they help to isolate noise and eliminate creeping. All Aspiration/Filtration Vacuum Systems should be mounted on a horizontal plane.

### 2.40 Pump Location

**2.41** The Aspiration/Filtration Vacuum System should be located preferably in a clean, dry, and well ventilated area. Please be sure not to block the ventilation holes located on the motor housing. The system should be placed where the surrounding temperature remains between 10°C and 40°C (50°F and 104°F). Always check to insure the location chosen is protected from direct or indirect moisture contact.



#### WARNING

**The motor is thermally protected and will automatically restart unexpectedly when the overload device resets. Don't pump flammable or explosive gases or vapors or operate this pump in an atmosphere containing flammable or explosive gases or vapors.**

## 2.50 Intake And Discharge Provision

**2.51** The vacuum regulator and vacuum dial gauge enable control of fluid aspiration into to the collection jar. The vacuum regulator allows the vacuum level to be set between roughly a atmospheric pressure and the maximum vacuum allowed for the pump model. A float valve on the collection jar and, hydrophobic filter keep water from accidentally being drawn into the unit. The regulator allows discharge pressure to be set between atmospheric and the maximum possible for the pump model. Model 2511 is equipped with a pressure port.

Note: Adjusting the vacuum regulators will affect the performance of the pump.



Models 2511B-75 / 2511C-75 / 2511C-76 / 2511C-77

Please contact Welch technical service prior to start up at 847-676-8800 if you have any questions.



### **WARNING**

**Never block the discharge port. If the exhaust is blocked, pressure will build-up in the pump above its rated operating pressure.**

## 2.60 Electrical Power




### 2.61 Power Source Review

Review the power source and the motor rating to be sure they agree in voltage, phase, and frequency. Serious damage may occur to the motor if it is connected to an improper voltage. All Welch pumps must be grounded. Grounding reduces the risk of electric shock in the event of an electrical short circuit. The plug must be plugged into a properly grounded outlet. Consult your local electrical codes if you have doubts.

### 2.62 Servicing of Double-Insulated Product

In a double-insulated product, two systems of insulation are provided instead of grounding. No grounding means is provided on a double-insulated product, nor should a means for grounding to be added to the product. Servicing of a double-insulated product requires extreme care and knowledge of the system and should be done only by qualified service personnel. Replacement parts for the double-insulated product must be identical to those parts in the product.

### 2.63 Classification And Symbol Glossary

	Double Insulated
	OFF (Power)
	ON (Power)

## 2.70 Vacuum Connection

2.71 For best results, Welch recommends the length of the tubing between the pump and the chamber be kept as small as possible.

## 2.80 Vacuum Gauges

2.81 All Aspiration/Filtration Vacuum Systems come with dial vacuum gauges. The vacuum gauge gives negative pressure - That is pressure below atmospheric. The reference point for the gauge is atmospheric pressure.

## 2.90 Traps

### 2.91 The need for a Trap

Model 2511 pumps are resistant to moisture-induced corrosion. The collection vessel has a float valve is attached to the regulator assembly to prevent water condensate from accidentally being ingested into the pump. An inline hydrophobic filter provides further protection against moisture ingestion.



### WARNING

The pump is not recommended for pumping acid, base or organic vapors or gases. Serious damage to the pump will shorten the pump's service life. In addition, pumping flammable vapors or gases can lead to serious safety hazard leading to fire or explosion.

## SECTION 3: OPERATION

### 3.10 Starting Procedures

#### 3.11 Starting a Welch Aspiration/Filtration Vacuum System

Before attaching the pump to a system, familiarize yourself with the function and action of the Aspiration/Filtration Vacuum System that you have acquired. Review the power requirements as described in Section 2.60. Welch recommends running the pump for a few minutes to warm it up, before use. The warm-up improves the pumps ability to handle humid air. Set the device on a level, sturdy surface so the controls can be easily reached and adjusted. Be certain that the tubing extends from the pump vacuum inlet through the inline filter to the collection vessel. Connect one end of the application tubing to the lid vacuum port marked “application”

Note: The in-line hydrophobic filter is designed to prevent foreign material from being drawn into the pump. Pump performance may decrease if the hydrophobic filter gets wet or build up of foreign materials or Medfilter occurs. Change the hydrophobic filter periodically to maximize pump performance and protection.

1. Be sure that the power switch is in the OFF (down) position. Plug in the device and turn the switch to the ON (up) position.
2. Adjust the rate of aspiration using the control knob and vacuum gauge.
3. Aspiration can be actuated by 1) turning pump on/off using a foot switch or 2) controlling liquid flow using a handheld pipettor.  
See 9.21 or visit [www.welchvacuum.com](http://www.welchvacuum.com) for fluid control options and pipette/manifold configurations

#### 3.12 Cleaning The Device

1. Make sure the ON/OFF switch is in the OFF (down) position.
2. Unplug the device from the wall outlet and allow suction level to drop.
3. Remove the application tube from the lid vacuum port. Tubing can be cleaned after every use.
4. Remove the pump tubing from the top of the jar lid.
5. Remove the jar from the holder and place on a firm, flat surface. Release the tabs and lift the lid from the jar. Dispose of aspirated fluid appropriately.
6. Wash the jar, gasket, lid and tube in a hot water/dishwashing detergent solution and rinse with hot tap water. The collection vessel and lid are autoclaveable and bleach resistant.
7. Wipe the outside of the case with a clean, damp cloth after each use.

### 3.20 Leak Detection

**3.21** If a leak exists, the pump must remove added volume of gas to maintain the desired vacuum. Check all tubing connections and ensure that collection vessel gasket is clean, in good repair, and fits flush to container and lid contact surfaces. Secure lid tabs firmly to compress gasket and facilitate proper sealing. Leaks for these pumps can be located by slightly pressuring the system and painting the suspected area with a thick soap solution. Escaping air will produce soap bubbles.

### **3.30 Operating Pressure Range**

**3.31** Aspiration/Filtration Vacuum Systems are designed to be run from slightly below atmospheric to their maximum vacuum level on the intake side. The pumps also may be run from atmospheric to their maximum rated pressure rating. Consult the Specification Table for the ratings of your specific model (See Section 6, Specifications).

### **3.40 Shutdown Procedures**

**3.41** After use, Welch recommends the pump be run for about 2 minutes disconnected from the vacuum process. The air pumped through the mechanism will purge out water vapor or droplets of water condensate that may have formed on the inside of the pump. This purge of the pump mechanism helps prevent corrosion, and maintain performance.

## **SECTION 4: MAINTENANCE**

### **4.10 Maintenance Procedures**

#### **4.11** Maintaining a Welch Aspiration/Filtration Vacuum System

These units are 100% oil-free. The pump employs a non-lube piston and cylinder. No maintenance is necessary for the bearings. All bearings are sealed and permanently lubricated. Lubrication should not be attempted.

#### **4.12** Empty collection vessel

Your 2511 aspiration station uses a float valve on the collection vessel lid to prevent overfilling and provide pump protection. To empty, remove the middle collection vessel tube ("to pump"), set lid aside, empty collection vessel appropriately, reinstall collection vessel and lid, and reconnect pump to lid.

#### **4.13** Hydrophobic Filter Replacement

Change the filter whenever foreign material is drawn into it or if you notice a reduction in vacuum level.

1. Disconnect the long tube from the fitting on top of the jar lid.
2. Gently pull the hydrophobic filter off of the short tube, that is connected to the regulator inlet port, and then remove the long tube from the hydrophobic filter .
3. With the green dot facing down, push the new hydrophobic filter into the short tube, that is connected to the regulator inlet port, then push the long tube.
4. Connect the long tube to the green dot facing barb, and then connect to the fitting on top of the jar lid.

## SECTION 5: TROUBLESHOOTING

### 5.10 VACUUM PROBLEMS

**5.11** Leakage, contamination, and unusual outgassing are the general causes of problems associated with poor vacuum. To operate at maximum efficiency, a system must be thoroughly clean. If the system is completely clean and free from leaks and unwarranted vacuum problems still exist, the pump should be checked. A simple criterion for the condition of the pump is the determination of its maximum vacuum capability. This can be accomplished by blocking of the intake and reading the vacuum level on the gauge (See Section 2.80).

### 5.20 PRESSURE PROBLEMS

**5.21** Leakage and contamination are the general causes of problems associated with poor pressure. To operate at maximum efficiency a system must be thoroughly clean. If the system is completely clean and free from leaks and unwarranted pressure problems still exist, the pump/compressor should be checked by a service technician.

### 5.40 TROUBLE SHOOTING GUIDE FOR 2511

<u>Symptoms</u>	<u>Possible Cause</u>	<u>Remedies</u>
Reduced/low vacuum/flow	<ol style="list-style-type: none"> <li>1. Clogged hydrophobic filter.</li> <li>2. Regulator improperly set.</li> <li>3. Air leak.</li> <li>4. Jar lid gasket not secured to jar.</li> <li>5. Collection vessel is full.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace the filter following directions in this manual. (Section 4.12)</li> <li>2. Set vacuum level following operating instructions.</li> <li>3. Check the tubing and connectors for possible leaks. Attach, tighten or replace.</li> <li>4. Be sure the jar lid and gasket fit tightly on the jar.</li> <li>5. Empty vessel and reinstall.</li> </ol>
Device does not start	<ol style="list-style-type: none"> <li>1. Power cord not plugged in.</li> <li>2. Defective switch.</li> <li>3. Vacuum still exists in system.</li> </ol>	<ol style="list-style-type: none"> <li>1. Plug in the power cord.</li> <li>2. Contact your service center or distributor. (See back page)</li> <li>3. Disconnect tubing from the collection jar to release vacuum. Reconnect tubing and turn on the device.</li> </ol>
Gauge reads incorrectly	<ol style="list-style-type: none"> <li>1. Faulty gauge.</li> </ol>	<ol style="list-style-type: none"> <li>1. Contact your service representative.</li> </ol>
Device runs but gauge reads "0"	<ol style="list-style-type: none"> <li>1. Gauge tubing not connected or is leaking.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the tubing and connectors for possible leaks. Attach, tighten or replace.</li> </ol>
Device stops running during use	<ol style="list-style-type: none"> <li>1. Device overheated.</li> <li>2. Blown fuse or circuit breaker in household circuit.</li> <li>3. Low voltage to device.</li> </ol>	<ol style="list-style-type: none"> <li>1. Unplug device and allow to cool for 10 minutes. Plug in and restart.</li> <li>2. Replace fuse or reset circuit breaker.</li> <li>3. Too many motor operated appliances on same circuit.</li> </ol>

## SECTION 6: SPECIFICATION

### 6.10 SPECIFICATION TABLE



Model 2511				
Cat. No.	2511B-75	2511C-75	2511C-76	2511C-77
Free Air Displacement CFM (L/min)	0.39(11)	0.32(9.2)	0.39(11)	0.39(11)
Maximum Vacuum in. Hg	21.3			
Ultimate Vacuum Torr (mbar)	219(292)			
Dimensions L x W x H in. (cm)	11.0 x 8.3 x 10.0 ( 28 x 21 x 25.5)			
Shipping Weight, lbs	6.4			
Electrical Requirements	115V, 60Hz	230V, 50Hz	100V, 50/60Hz	230V, 60Hz

## SECTION 7: WARRANTY

**IMPORTANT**  
**Please Read Carefully Before Operating**  
**This Welch® Vacuum Pump**

### **Unpacking**

Inspect the pump carefully. If any damage has occurred, file claim with the freight carrier immediately. Save the shipping container for carrier to inspect.

### **Operating Pump**

Refer to the Instruction/Operation Manual for all information to properly operate and maintain the pump

### **Warranty**

The Welch Vacuum product is warranted to be free from defects, in material and workmanship. The liability of Gardner Denver Welch Vacuum Technology, Inc. under this warranty is limited to servicing, adjusting, repairing or replacing any unit or component part which in the judgement of Welch Vacuum has not been misused, abused or altered in any way causing impaired performance or rendering it inoperative. No other warranties are expressed or implied. The method of executing this warranty: servicing, adjusting, repairing or replacing shall be at the discretion of Welch Vacuum. Vacuum pumps that have been used for any period, however short, will be repaired under this warranty rather than replaced.

The warranty is effective for one year from the date of original purchase when:

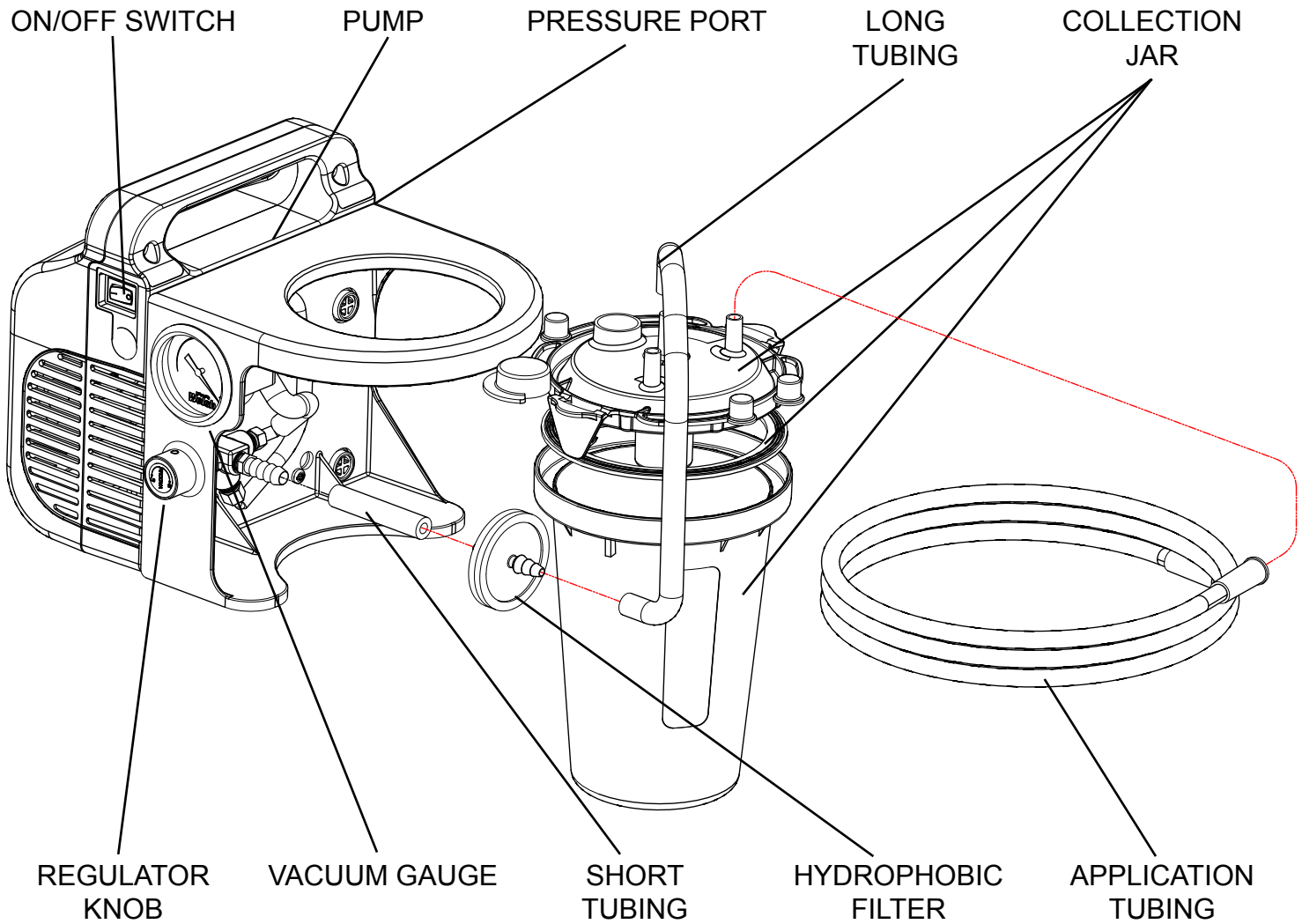
1. The warranty card has been completed and returned.
2. The product is returned to the factory or other designated service centers, freight prepaid.
3. The product, in our judgement, is defective through no action or fault of the user.

If the product has become defective through misuse, abuse, or alteration, repairs will be billed regardless of the age of the product. In this event, an estimate of the repair costs will be submitted and authorization of these charges will be required before the product is repaired and returned.

To reduce the additional charges and delays either within or outside of the warranty period, contact Welch Vacuum at (847) 676-8800 for a return authorization number. Products without a return authorization number will be returned by our receiving department. Before shipping, pack the pump properly and insure it against loss or damage. Pumps damaged due to improper packaging are the customer's responsibility. Mark the outside of the carton and the packing slip with the return authorization number.

## SECTION 8: EXPLODED VIEW & PARTS LIST

### 8.10 Model 2511B-75 / 2511C-75 / 2511C-76 / 2511C-77



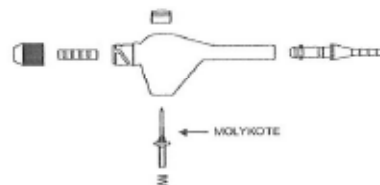
## 9.20 VACUUM ACCESSORIES

### 9.21 Table for Vacuum Accessories

#### Operating Instructions: Hand-Held Pipettor(cat. no. 1475K-10) for Welch® Aspirator Stations

##### Operation

The vacuum is controlled by the pressure sensitive turquoise control button on the top of the hand piece. By means of the plastic screw opposite the control button, the residual suction level can be set, which will prevent dripping of waste liquids from the tip or pipette. The aspirator is factory pre-set to allow a low level. Turn the screw one full turn clockwise, the valve is shut and residual vacuum is stopped.



##### Cleaning and servicing

The hand-held pipettor is entirely autoclavable. When working with biohazardous material, sterilize the unit before disassembling for cleaning. Please refer to the exploded view drawing.

To clean, immerse the pieces in mild laboratory detergent, but do not use abrasives, as a roughened surface may affect the smooth operation of the control valve. Apply a thin coat of MOLYKOTE HP-870(Dow Corning) lubricant as needed to the control valve to keep the action smooth(arrow).

When working with salt-rich solutions, rinse out the aspirator hand-held pipettor with distilled water after use to avoid build-up of dried deposits.

##### Chemical compatability

Avoid prolonged contact( days or weeks) with:

- concentrated inorganic acids
- methylene chloride
- concentrated aldehydes
- other halogenated hydrocarbons

Resistant to:

- ethanol/methanol
- mild bleach solution (Rinse promptly)

##### Note:

- Flush the aspirator with ethanol immediately after contact with organic solvents
- For o-ring replacement, use Viton® o-rings only.

## Accessories for Welch Aspiration Stations

### HAND HELD PIPETTOR FOR ASPIRATION STATIONS



1475K-10

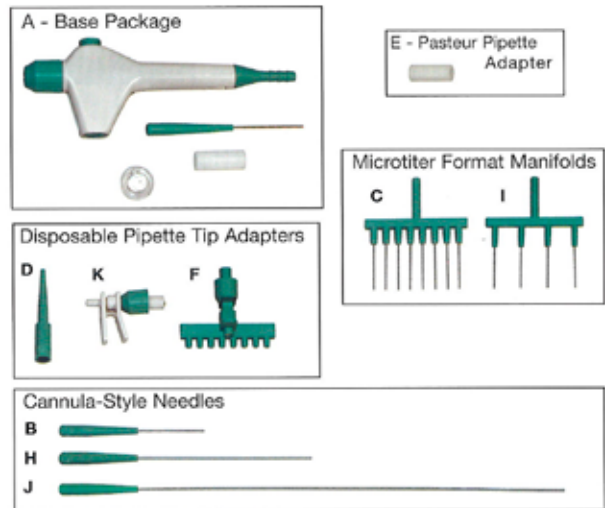
- Quick pipette/manifold adaptation
- Precise vacuum control button
- Ergonomic design lessens strain
- Solution contact surfaces autoclaveable

#### CONTROL YOUR ASPIRATION APPLICATION WITH EASE.

The handheld pipettor system (1475K-10) provides pressure sensitive button control and enables quick conversion for aspiration from a variety of vessel formats. An adjustment screw allows you to set the right residual suction to prevent drippage during pipette use; closing the adjustment screw stops all residual vacuum. Single channel and four and eight channel stainless steel manifold adapters work well with a wide range of liquid media. The single and eight channel disposable tip adapters include a convenient tip ejector. Also for use with standard volumetric pipettes. The entire unit is autoclaveable and disassembles easily for cleaning.

### Ordering Information for Aspiration Accessories

Description	Model	Image
Handheld pipettor with 1 channel stainless steel 40 mm aspiration adapter and Pasteur pipette adapter	1475K-10	A
Adapter, stainless steel tip, 40mm	1475K-01	B
8-channel adapter, stainless steel	1475K-02	C
1-channel adapter for disposable tips, w/o ejector	1475K-03	D
Rubber adapter for Pasteur pipettes	1475K-04	E
8-channel adapter for disposable tips, with ejector	1475K-05	F
Adapter, stainless steel tip, 150mm	1475K-06	H
4-channel adapter, stainless steel tips, 40mm	1475K-07	I
Adapter, stainless steel tip, 280mm	1475K-08	J
1-channel adapter for disposable tips, with injector	1475K-09	K
Spare receiver kit-Includes: 6 ft tubing, 1.2L autoclaveable jar w/ lid and two hydrophobic filters	1475K-20	L
Replacement hydrophobic filters (10)	1475K-21	M



2511



2515

### Compact Model 2511 Station

Cat. No.	Description
2511B-75	11 l/min 115V 60Hz
2511C-75	9.2 l/min 230V 50Hz
2511C-76	11 l/min 100V 60/50Hz

### High Flow Model 2515 Station

Cat. No.	Description
2515B-75	34 l/min 115V 60Hz
2515C-75	28 l/min 230V 50Hz
2515C-76	34 l/min 100V 60/50Hz



### 9.30 ELECTRICAL ACCESSORIES

#### 9.31 Table for Electrical Accessories

Description	Welch Kit
115V 60Hz - Maintained on/off footswitch 	1430A
115V 60Hz - Variable on/off footswitch 	1430B
90-230V 50/60Hz - Variable on/off footswitch with IEC connections 	1430C

### 9.40 REPLACEMENT ACCESSORIES

#### 9.41 Table for Replacement Accessories

Description	Welch Kit
Aspiration Kit - Includes: 6 ft tubing, 2000ml Autoclavable jar w/lid, and two hydrophobic filters 	1475K-20
ten hydrophobic filters 	1475K-21



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