

**DabOut™ LVS**  
Catalog # DO-LVS-110  
**Installation, Operation, &  
Service Manual**  
Version 1.2, April 2001

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## INTRODUCTION

Congratulations on your purchase of a new TBS® DabOut Large Volume System for removing 3,3-Diaminobenzidine (DAB) from automated immunohistochemistry (IHC) stainer waste. This innovative instrument is designed to meet the requirements of today's immunohistochemistry laboratory by offering the convenience of complete adaptability to every automated IHC machine. The unique system design requires no water hookup, ventilation or special electrical plugs. The complex matrix inside the replaceable DabOut LVS filters will remove virtually all DAB to levels below delectability. Once the DAB waste is filtered, the effluent can be safely drain disposed. The cartridge containing DAB are safe for incineration or can be disposed as a dry solid hazardous waste. The completely contained system reduces possible exposure to DAB waste and is engineered to reduce spill potential. By providing a hands-off method of treating DAB waste at the point of generation, DabOut LVS reduces time spent in handling waste and helps contribute to safer lab conditions. Reducing the amount of waste that may potentially find it's way into the waterway, DabOut LVS saves the environment. With routine care this instrument will provide many years of service.

## GENERAL WARNINGS

Before using this instrument, please make certain that you carefully read this manual. Pay particular attention to the precautions and warnings for safe use and operation of this instrument.

The DabOut LVS (Cat # DO-LVS-110) is an instrument designed for laboratory use. It can only be used to filter DAB from automated IHC waste.

This instrument should only be operated by qualified technicians.

The warranty applies only if the instrument is used in the correct manner and in accordance with the information and advice provided herein. The manufacturer declines all responsibility for possible damages to persons and/or objects due to improper use of this instrument.

## REGULATORY COMPLIANCE

The pump and timer have been tested by a registered independent body to rigorous international quality and safety standards, and have been found to be in compliance with the following regulatory/specifications:

Applicable Directives:     73/23/EEC  
                                   93/68/EEC

Conforms to:                EN 61010-1:1993/A2: 1995 "Safety requirements for electrical equipment for measurement, control and laboratory use."

UL per 460 D

Certified to:                IEC 664  
                                   IP21 per IEC 529

## TRADEMARKS

TBS<sup>®</sup> is a registered trademark and Innovations for Science<sup>™</sup>, DabOut<sup>™</sup> and DabOut<sup>™</sup> LVS are trademarks of Triangle Biomedical Sciences, Inc., Durham, NC U.S.A.

# SAFETY PRECAUCATIONS

**DabOut LVS is only recommended for use under the following conditions:**

- Indoor use only
- Operation at altitude below 2000m
- External ambient temperatures between 20°C and 40°C
- Humidity 80% for temperatures up to 31°C, decreasing linearly to 50% at 40°C
- UL Installation Category II
- UL Pollution Degree 2

If severe visible damage occurs during shipping **DO NOT** connect the instrument to a power source. Contact TBS technical service.

Damage may result if unit is connected to power supply different from that stated in this manual and stated on the identification tag on the bottom of the stand. **DO NOT** use instrument unless it is connected to a properly grounded outlet.

**DO NOT** run volatile, flammable or corrosive substances through DabOut System. Use specific precautions when handling Dab Waste as it may cause irritations.

**CAUTION:** 3,3-Diaminobenzidine (DAB) is a suspected carcinogen, mutigen, teretigen.

**DO NOT** wear clothes that are loose and prone to snagging or catching on metal edges. Access to the instrument's internal components is reserved to only those specialists trained in the service of the instrument. Always disconnect the unit from the power source before performing maintenance or accessing the electronics.

Check the end of the intake line occasionally as particle buildup could interfere with the flow volume. Avoid probing the cartridge valve with sharp objects as they may puncture the seal.

If aqueous liquid begins to leak from cartridge or instrument from areas other than the line ends, turn off unit and disconnect for power source. Contact TBS technical service.

Unused DabOut LVS cartridges **DO NOT** contain material that require disposal as hazardous waste under United States Resource Conservation and Recovery Act (RCRA).

## **Flow Rate:**

The DabOut LVS system is designed to process aqueous waste from automatic IHC staining solutions containing DAB. The cartridges should be replaced after processing 40 gallons of aqueous DAB waste or 90 days after initial use. Waste can be processed at a rate of approximately 1.5 gallons per hour.

# INSTRUCTIONS

## Installation:

1. Remove equipment from shipping carton carefully. **DO NOT** lift the pump using the pump head. Save shipping carton and all packing material until proper operation of equipment is confirmed. Immediately notify carrier if there is any visible damage to the carton or contents. Failure to do so may limit your ability to recover damages.
2. Connect the power cable to the unit and into a properly grounded outlet. Check the label on the rear of the instrument for the electrical requirements. **DO NOT** connect the unit to an outlet that does not match the electrical requirement listed on the label.

## Assembly:

1. Set up the system so that the liquid flows from the waste storage container, into the "IN" port of the cartridge, through the cartridge, then through the peristaltic pump and into the collection vessel (see product picture).

## Set-up

1. Please refer to the product picture at the back of this manual
2. Locate the DabOut LVS cartridge.
3. Place the cartridge in the support stand.
4. Attach one length of 3/8" I.D. peristaltic pump tubing, long enough to reach your waste storage container, to the barbed male quick-connect adapter labeled "IN".
5. Attach another length of 3/8" I.D. peristaltic pump tubing to the barbed female quick-connect adapter. This length of tubing should be long enough to pass from the "OUT" port, through the peristaltic pump and to the collection vessel (see product diagram).
6. Attach the quick-connect adapters to the ports located on each side of the top of the cartridge.
7. Attach dip-tube valve barb to end of "IN" line tubing.
8. At least once every 5 gallons pour one ampoule of antibacterial agent into the waste storage container before running waste into the container. Then process waste as usual.

**NOTE:** The tubing used with peristaltic pumps supplied with the DabOut LVS should be changed after 1000 hours of use or after processing 1500 gallons.

### Operation:

1. Securely connect the input tubing to the waste storage container. If you have Ventana waste containing Liquid Cover Slip (LCS), use one of the three options below to prevent contamination and turn off the pump prior to any LCS running through the system.
  - Use the supplied dip-tube to siphon liquid from the bottom of the container.
  - Connect the tubing to a carboy spigot and turn off the pump prior to any LCS running through the system.
  - Decant off the aqueous fraction of the waste and run the tubing from the new “aqueous only” waste container.
2. Label the cartridge with the red warning label “Contains Hazardous Waste DAB (Diaminobenzidine)”.
3. Securely connect the output tubing to the processed waste collection vessel.
4. Turn the timer on. The timer controls the peristaltic pump.
5. When the waste storage container and the tubing from the waste storage container are empty, turn off the pump.
6. If you plan to reuse the cartridge, refer to section, “Replacing & Storing of the Cartridge”. When the cartridge is ready for disposal, refer to section, “Preparing the Cartridge for Disposal”.
7. On the usage log supplied with the system, mark the number of gallons processed through DabOut LVS.
8. Process the waste as soon as convenient after generating the waste. Do not allow the waste to sit for long periods of time as bacteria will grow and limit the effectiveness of the cartridge.

**CAUTION:** Do not allow Liquid Cover Slip (LCS) to run through the cartridge. Contamination with LCS will severely diminish the binding capacity and flow rate of the cartridge.

### Replacing & Storage of the Cartridge:

The DabOut LVS cartridge should be replaced after processing 40 gallons of aqueous DAB waste or 90 days after initial use. To store the cartridge between uses disconnect the quick-connect adapters from the “IN” and “OUT” ports of the cartridge. For optimal cartridge performance, keep the cartridge hydrated. The cartridge should be rehydrated if the pump has been left running after the waste has been drawn completely through the “IN” tubing.

To re-hydrate the cartridge, follow these steps:

1. Pour one to two (1-2) liters of distilled water into the waste storage container.
2. Draw the distilled water into the cartridge.
3. Just as the last of the distilled water is drawn through the tubing and into the cartridge, turn off the pump.

**CAUTION:** There may be a small amount of residual liquid ( $\leq 5$ mls) in the cavity of the female portion of the quick-connect adapter attached to the “OUT” port of the cartridge. When disconnecting the adapter from the cartridge take care to use a disposable absorbent material as a blotter for any liquid that may still be present. When disconnecting the tubing from the cartridge, **ALWAYS** wear appropriate safety equipment including but not limited to gloves, safety glasses and a lab coat.

4. As you disconnect the quick-connect adapter from the “OUT” port of the cartridge, elevate it to drain excess processed liquid from the tubing into the collection vessel.

*Preparing the Cartridge for Disposal:*

**WARNING:** The cartridge must have all excess liquid removed prior to disposal as a dry solid hazardous waste. Simply run the system dry for an hour to remove all excess liquid.

**CAUTION:** There may be a small amount of residual liquid ( $\leq 5$ mls) in the cavity of the female portion quick-connect adapter attached to the “To Pump” port of the cartridge. When disconnecting the adapter from the cartridge use a disposable absorbent material as a blotter for any liquid that may still be present. When disconnecting the tubing from the cartridge, **ALWAYS** wear appropriate safety equipment including but not limited to gloves, safety glasses and a lab coat.

1. Drain-dispose any liquid that has accumulated in the collection vessel.
2. Disconnect the quick-connect adapter from the “IN” port of the cartridge.
3. Put the disposal black cap over the “OUT” adapter on the cartridge.
4. While pressing down on the release button insert the blue disposal plug into the “IN” adapter on the cartridge.
5. The cartridge is now ready to be disposed as dry solid hazardous waste.
6. Place the cartridge into the disposal bag, zip the bag closed and dispose as chemical hazardous waste for incineration in an approved incinerator with scrubbers. **DO NOT** dispose as “red bag”/infectious waste.

# SERVICE

Before using this instrument, please make certain that you carefully read this manual. Pay particular attention to the precautions.

## Trouble Shooting:

Only trained service technicians should open the unit.

**WARNING:** Main voltages are accessible when the housing is removed, the unit should be turned off and unplugged before the housing is opened.

The cartridge has a slow flow rate:

- If the cartridge has filtered close to the 40 gallon limit, the flow rate may slow down. The typical flow rate is 30-45 minutes per gallon.
- If Liquid Cover Slip (LCS) has contaminated the cartridge it will slow down the flow rate. Replace cartridge
- If waste stream has a high concentration of BSA it will slow down the flow rate. Dilute waste stream with water.
- If the waste stream has a high concentration of detergent/surfactants it will slow down the flow rate. Dilute waste stream with water.
- Excessive bacteria build-up will slow flow rate. Use bactericide.

If the flow of the cartridge is spartic:

- Check the line for a blockage. Check all lines.
- The cartridge may need to be rehydrated.
- The waste container may be empty.

The system is pumping out air:

- Check to see that the system, pump and timer are on.
- Check the line for a blockage. Check all lines.
- Check to make sure that the pump is pulling the waste through the cartridge.
- There could be a leak in the hose. Replace tubing and connectors.
- If the cartridge is pumping out bubbles. The cartridge may be defective.
- Check all of the quick-connects to be sure they are fully and properly attached.

The system has stopped running:

- Check to see timer is on
- Check to see system is plugged in.
- Use a regular screwdriver to turn pump head. If nothing happens call TBS service.

There is dirty material coming out of cartridge:

- If color is brown (like DAB waste). Replace cartridge.
- If color is light brown, it is bacteria. Add bactericide. If color persists, replace cartridge.
- If color is black, it is the cartridge matrix. Stop system. Run cartridge dry for 20 minutes. Then continue filtering. If black material persists, replace cartridge.

## **TECHNICAL SUPPORT**

TBS Customer Service department can be reached by calling (919) 384-9393.

Hours of Operation are:

Monday through Thursday: 8am-6pm (EST)

Friday: 8am-5pm (EST)

TBS Technical Product Service department can be reached by calling 1-800-871-5975.

Hours of Operation are:

Monday through Friday: 7:30am-5pm (EST)

# SPECIFICATIONS

*Catalog Number*

DO-LVS-110

*Description*

DabOut, Diaminobenzidine removal system for automated IHC waste, Large Volume System (LVS), includes 2 quick-connector adapters, disposable sealing cap & plug, stand, 60 rpm peristaltic pump, timer, dip-tube w/in-line valve, and 1 DabOut LVS cartridge (DO-LVS-C).

<i>Electrical Requirements</i>		110-115VAC 60 HZ 2.0 Amps
<i>Dimensions (WxDxH) in. cm.</i>		15 x 15 x 15 38 x 38 x 38
<i>Weight</i>	lbs. kg.	14 6.4

## PARTS LIST

*Included in the shipment of the DabOut LVS system is the following:*

Quantity	Description
1	DabOut LVS cartridge
1	Disposal sealing plug
1	Disposal sealing cap
2	Quick-connect tubing adapters
1	Usage log
1	Cartridge support stand
1	Timer
1	60-rpm pump
2	Lengths of yellow Tygon tubing
1	Dip-tube and connector valve/barb
1	Disposal bag
1	Red warning label
10	Antibacterial ampoules
1	Operators Manual
1	DabOut MSDS
1	Bactericide MSDS



# **WARRANTY INFORMATION**

## ***USE AND REGULATION***

DabOut is a product for concentration of hazardous waste. While DabOut LVS reduces the volume of waste, use of DabOut LVS does not exempt the user from laws and regulations applicable to the treatment, handling or disposal of such wastes. It is the user's responsibility to handle and dispose of the DabOut LVS cartridge and any filtered liquid in compliance with all-applicable laws and regulations. By using DabOut LVS the user represents and recognizes that the user is knowledgeable in the handling of hazardous wastes and related material, assumes the risk of handling such wastes and materials and that the user needs to and will take appropriate independent precautions and will comply with all the applicable federal, state and local regulations for the handling of DabOut LVS and hazardous material used in connection with DabOut. DabOut LVS will not function properly if the enclosed instructions are not followed. Safe use of DabOut LVS requires, but is not limited to proper assembly of the DabOut LVS system as demonstrated in the enclosed instructions and using appropriate protective devices when using DabOut LVS. Users of DabOut LVS should contact their institution's safety officer or safety committee to confirm procedures for using DabOut LVS under the institution's safety procedures.

## ***DISCLAIMER***

DabOut LVS is warranted to the buyer to be free of defects in materials and workmanship when used in accordance with the enclosed instructions for a period of one year after delivery. TBS will repair, replace, at its option, any products that are found to be defective, provided that the buyer gives written notice of the defect within the warranty period. Buyer shall make product available for TBS's inspection or at TBS's option shall return the product to TBS. TBS will return a new product to buyer, freight prepaid to any location. This warranty is in lieu of all other warranties or obligations expressed or implied. TBS expressly disclaims all implied warranties of merchantability or fitness for a particular purpose. Buyers' exclusive remedy for breach of warranty is replacement or refund at TBS's option.

## ***LIMITATIONS & LIABILITY***

In no event will TBS be liable for any indirect special, incidental, punitive or consequential damage of any kind, sustained from any cause relating to the DabOut LVS product. In no event shall TBS be liable to buyer in an amount exceeding the purchase price. These limitations apply to any claim, whether based upon contract, negligence, strict tort liability, or any other legal theory, arising out of or relating to the DabOut LVS product.

*Specification and technical data are current at the time publication; however, they are subject to change without notification. Please contact our North Carolina office for updated information.*