

PROBLEM	LIKELY CAUSE	RESOLUTION
Air Bubble in cartridge tube during inflation	<ul style="list-style-type: none"> <li>• Insufficient amount of mercury</li> <li>• Air trapped in reservoir</li> </ul>	<ul style="list-style-type: none"> <li>• Add mercury by following the instructions in this manual</li> <li>• To remove trapped air, tap reservoir while system is inflated</li> </ul>
Blood Pressure Reading seems High	<ul style="list-style-type: none"> <li>• Excessive deflation rate</li> <li>• Air flow blockage</li> </ul>	<ul style="list-style-type: none"> <li>• Be sure to deflate the inflation system at the recommended rate of 2-3mmHg/sec</li> <li>• Change top cap filter</li> <li>• Clean or replace mercury</li> </ul>
Blood Pressure Reading seems Low	<ul style="list-style-type: none"> <li>• Mercury level low</li> </ul>	<ul style="list-style-type: none"> <li>• Add mercury</li> </ul>
Dirty cartridge tube	<ul style="list-style-type: none"> <li>• Mercury has oxidized leaving a silver gray residue</li> </ul>	<ul style="list-style-type: none"> <li>• Clean tube in accordance with enclosed instructions</li> </ul>
Mercury bouncing in tube during inflation or deflation	<ul style="list-style-type: none"> <li>• Filters need replacements</li> </ul>	<ul style="list-style-type: none"> <li>• Change top cap filter</li> </ul>
Mercury drops appear outside the top or bottom of the cartridge tube	<ul style="list-style-type: none"> <li>• Leak at seals</li> </ul>	<ul style="list-style-type: none"> <li>• Make sure cartridge tube securely seated</li> <li>• Replace silicone gaskets at top and bottom of tube</li> </ul>
Mercury rises or falls slowly	<ul style="list-style-type: none"> <li>• Air flow blockage</li> </ul>	<ul style="list-style-type: none"> <li>• Change top cap filter</li> <li>• Clean tube in accordance with enclosed instructions</li> </ul>
Mercury separates in tube during deflation	<ul style="list-style-type: none"> <li>• Excessive deflation rate</li> <li>• Trapped air</li> </ul>	<ul style="list-style-type: none"> <li>• Be sure to deflate the inflation system at the recommended rate of 2-3mmHg/sec</li> <li>• To remove trapped air, tap reservoir while system is inflated</li> </ul>

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Consult this manual for basic service and maintenance procedures mentioned in this troubleshooting guide. If any of the problems persist, contact ADC's Customer Service Department Toll-Free at 1-800-ADC-2670.

# JUST IN CASE . . .

## ADC GUIDELINES

for the Proper  
Maintenance,  
Handling, Cleanup,  
and  
Transportation  
of  
Mercurial Blood  
Pressure Devices



## INTRODUCTION

Thank you for choosing an ADC DIAGNOSTIX™ Mercury Sphygmomanometer. We're proud of the care and quality that goes into the manufacture of each and every blood pressure instrument that bears our name.

Only the finest materials are used to assure you of a timeless instrument designed for optimum, safe performance. You'll quickly appreciate the results for you now own the most intelligently designed, feature-rich mercurial sphygmomanometer that money can buy.

With proper care and maintenance your ADC DIAGNOSTIX™ Mercury Sphygmomanometer is sure to provide you with many years of dependable service. This brochure answers the most frequently asked questions about these instruments, how to maintain them, and what to do in the unlikely event that a mercury spill should occur. Please read this manual thoroughly and retain for future reference.

## PREVENTIVE MAINTENANCE

Because the mercury units do not rely on moving parts such as metal bellows, diaphragms, gears, or other sources of mechanical wear, only an occasional inspection of the instrument is recommended.

A regular program of preventive maintenance will extend the life of your sphygmomanometer. The program should include the following simple inspection steps:

1. The mercury level in the graduated plastic tube should be at the "0" calibration mark with the inflation system disconnected and the mercury unit in a vertical position.

**Note:** *If the mercury level is below "0", readings over the entire scale will vary only the difference between the mercury level and the "0" calibration.*

2. Airflow should be tested by partially inflating the instrument to observe the rising column of mercury, and then slowly deflating - stopping the column at several points - to observe the falling column.

The diaphragm filter should be replaced if the mercury does not rise easily in the tube, or if the mercury column bounces noticeably.

**Note:** *The diaphragm filter is designed to dampen oscillations of the mercury during inflation and deflation while preventing escape of the mercury. If clogged due to accidental over inflation, it may require replacement.*

3. The graduated plastic tube should be clean. If it is streaked with mercury which has oxidized, the tube and mercury should be cleaned as described in this booklet.
4. The inflation system, consisting of the ADCUFF™, inflation bladder, bulb, and ADFLOW™ valve can be tested for air leaks.

## REPAIRING MERCURY LEAKS

If a mercury leak exists at the top or bottom of the plastic tube, the silicone rubber washers, which provide a seat for the ends of the plastic tube, should be replaced. Remove the cartridge tube. Then use a small screwdriver to remove the old silicone rubber washers, and replace with correct size new washer. Replace the graduated plastic tube.

If a mercury leak exists at the bottom of the reservoir, see the following section "How to Clean or Replace Mercury," which includes steps for replacement of the reservoir gasket.

After a mercury leak has been repaired, check the level of the mercury meniscus (the top rim of the mercury column in the plastic tube). If it is below the "0" calibration, add enough mercury to bring it up to the correct level. This is done by unscrewing the knurled chrome cap at the top of the plastic tube and pouring a small amount of

5. Place the double polybagged and wrapped unit inside the packing case, or inner carton.
6. Arrange some cushioning bags or more bubble wrap around the mercurial unit to protect it from excessive shifting.
7. If returning two or three mercurial units, repeat steps 1-6 as necessary. We suggest packaging each of the mercurial units in separate inner cartons that can fit into the packing case.
8. Seal the packing case closed with a strip of adhesive tape. Carefully place the *specialty authorized* return address label to the top of the box.
9. Ship via UPS Prepaid Ground Service ONLY. No other carriers are authorized use for safe return of mercury instruments.

## What is a Material Safety Data Sheet (MSDS)? Why do I need it and how do I get one?

A MSDS sheet is required by OSHA. All medical locations require you keep it on file. A MSDS provides you with information about mercury, and what protective measures you have to do for your safety. Your ADC dealer will provide you with the MSDS upon request.

## ADC PROBLEM SOLVING GUIDE

Questions or Comments Call Toll-Free  
**1-800-ADC-2670**

[www.adctoday.com](http://www.adctoday.com)

The information contained within this guide is provided in good faith and is believed to be correct as of the date published. ADC makes no representation as to the completeness or accuracy of the information. It is understood that the person receiving this information will use good judgement to determine proper actions to be taken. Information contained within does not provide any warranties, expressed or implied.

mercury and damaged ADC DIAGNOSTIX™ instrument. Please call our customer service department toll free at 1-800-ADC-2670. They will send you out a complete mercury return kit p/n 985 along with detailed instructions on the proper packing and return of the damaged instrument and collected mercury.

#### How do I return a broken unit?

Regardless of whether or not the unit is intact (no mercury leakage) it may be returned to ADC for service via UPS. When returning an intact mercurial unit, be sure to include a note listing your name, address, daytime phone number, and symptoms of the unit. When packing mercurial units for transport, be sure to follow the instructions in the "Packing and Shipping" section below.

**Send to:       ADC**  
**Attn: Service Department**  
**55 Commerce Drive, Hauppauge, NY 11788**

If the unit is damaged and mercury has leaked, please call our customer service department at 1-800-ADC-2670. We will be happy to send you a complete mercury return kit, part number 985 with instructions on the safe transportation of the product. Please note that the mercury return kit is NOT necessary but is provided as a convenience. If you choose not to use an ADC return kit, you will need a leak-proof, sealable 3 mil plastic bag (for each unit), rubber bands/twist ties/fasteners, a 200 test corrugated carton, and the appropriate shipping labels. Only the manometer itself and not the inflation system (cuff, connectors, bulb and valve), wall brackets, or mobile base (depending upon the unit) need be returned. Please be sure to follow the instructions for shipment in the "Packing and Shipping Instructions" section below.

**Note:** We can only accept the return of ADC's DIAGNOSTIX™ mercurial instruments for repair services.

#### PACKING AND SHIPPING INSTRUCTIONS

**Important Note:** Failure to follow the proper packing and shipping instructions below for mercurial return kits could result in mercury leakage during transit. The shipper will be responsible for all costs associated with cleaning mercurial spills that were caused by improper packaging and shipping methods.

You will be sealing each mercury unit in TWO polybags with bubble wrap in between. Only pack a MAXIMUM of 3 units per return. (Assorted styles are acceptable) It is very important to note that the Department of Transportation (HAZMAT) requirements will require special caution labels for any boxes that contain 1 pound or more of mercury. Three mercurial units are below this 1 pound requirement, and do not require any additional labeling.

1. Remove the inflation system, basket(s), rod, and base from all mercurial units before packing and dispose of in accordance with local regulations. ADC will ONLY accept the main mercurial units for return.
2. Put ONE mercurial unit in a polybag and seal it with a twist tie or rubber band closure.
3. Wrap bubble wrap around the mercurial unit and secure with adhesive tape. This will help prevent the port connector from puncturing the second polybag.
4. Enclose the wrapped mercurial unit in another polybag. Seal the polybag with another twist tie or rubber band closure.

mercury into the tube with the help of a small paper cone or funnel. The instrument is then tipped in the direction of the reservoir and returned to a vertical position before the new mercury level is observed. Repeat the process as necessary to bring the mercury up to the "0" calibration mark.

#### HOW TO CLEAN OR REPLACE MERCURY

When removing the mercury from an instrument we strongly suggest you wear disposable rubber gloves and goggles. Be sure to remove all jewelry. Also, an inexpensive plastic storage box makes an excellent portable work station. Unscrew the knurled cap at the top of the graduated plastic tube. Then carefully pour all the mercury into a paper cup or glass container by tipping the instrument back and forth away from reservoir in order to get all the mercury out of the reservoir.

Roll a small cone of ordinary copy paper, leaving a small opening at the end of the cone, and pour the mercury through this cone into another clean paper cup or glass container. Repeat a few times. Residue will adhere to paper.

Remove the graduated plastic cartridge tube and clean it. The bore of the tube may be easily cleaned with alcohol and a lint free pipe brush. The outside of the tube should also be cleaned occasionally by wiping with a damp cloth.

Replace the graduated plastic tube and return the clean mercury to the instrument through the opening at the top of the tube, using the paper cone described above. Check the mercury level - it should be at the "0" line on the plastic tube with the inflation system disconnected and the instrument in its correct position (vertical for desk or wall mount models, 15° incline for mobile instruments). If some mercury has been lost, add enough (through the top of the plastic tube) to bring the rim of the mercury meniscus to the "0" calibration mark. Then replace the knurled cap at the top of the graduated plastic tube, and screw it down firmly.

#### REMOVING THE GRADUATED PLASTIC TUBE

ADC's EZ-Tube™ system facilitates removal of the 5mm graduated plastic cartridge tube. To remove, follow these steps:

1. Force mercury out of the cartridge tube by tilting instrument TOWARDS reservoir (to the right on 922, to the back on 932, 952, or 972).

**Note:** The 952 must first be removed from its swivel wall bracket.

2. Secure the mercury within the reservoir by moving the lock switch to the "Off" position.

**Note:** Make sure all mercury is out of the cartridge tube.

3. Lift on the spring loaded EZ-Tube™ mechanism located at the top of the instrument (932, 952, 972). Tilt instrument forward to free tube. If necessary use a small flathead screwdriver to help dislodge the top of the tube. On 922, remove knurled top cap by turning counterclockwise. Remove tube, by sliding upward until fully dislodged.
4. To replace tube, lift EZ-Tube™ mechanism and insert base of tube into main unit, being sure graduation marks face out. Next, position top of tube and release EZ-Tube™ mechanism. On 922 replace by sliding down through top cap opening and position. Secure top cap by turning clockwise until tight. Be sure to tighten thoroughly.
5. Unlock reservoir and tilt instrument AWAY from reservoir forcing mercury back into tube.
6. Check for "0" point.

## IF A MERCURY SPILL OCCURS . . .

### FAQ (FREQUENTLY ASKED QUESTIONS)

#### Why use mercury?

Mercury (Hg) is a liquid metal with very stable performance characteristics. As such, mercurial blood pressure devices remain the internationally recognized standard for accuracy. Because there are no moving parts, springs, needles, casings, or other components that may become defective or wear with age, mercury instruments are inherently the most reliable and accurate. With minimal care and maintenance, these instruments should last a lifetime.

#### What is so special about DIAGNOSTIX™ mercury instruments?

Our exclusive Safety First™ system incorporates a number of distinctive safety features that provide you with a level of protection no other mercurial instrument can match. **Unbreakable graduated plastic cartridge tube.** Designed from space age polymers, the tube exhibits remarkable performance stability. It will not crack, craze, or shatter. Yellowing, a problem that plagued first generation plastic tubes, is all but gone. Tolerances to .1mm assure measurement repeatability.

**Reservoir Locking Switch** secures the mercury safely in the reservoir during routine maintenance, cleaning, or transport.

**EZ Tube™ System** simplifies the safe removal of the cartridge tube or top cap filters for cleaning or maintenance without risking a spill.

#### Is Elemental Mercury dangerous?

Yes, it can be. Once vaporized, the lungs readily absorb elemental mercury from inhaled air. High level acute doses and lower level chronic doses are both causes for concern.

If accidentally ingested, very small amounts of elemental mercury will not be absorbed by the digestive system and will be excreted.

Some forms of mercury COMPOUNDS (not the type used in blood pressure instruments) are highly toxic and particularly dangerous. These should NOT be confused with elemental mercury.

Because there is so little actual mercury in a mercurial blood pressure instrument, the exposure to a spill or leakage, if properly and promptly contained, will generally pose little if any health risk.

DIAGNOSTIX™ Blood Pressure instruments use less than 2 ounces of 99.9999% pure elemental mercury.

#### What should I do in the event of a spill?

First, isolate the area to prevent further contamination or spread of the spilled liquid. Spilled mercury should be picked up at once since the mercury will vaporize rapidly and may contaminate the surrounding air.

Larger spills involving the entire contents of the mercury instrument (about 2 oz.) may be cleaned up with a commercially made mercury suction pump. Do not dry sweep or use ordinary vacuum cleaners on floors exposed to mercury spills since this may produce additional hazardous vapors.

In the unlikely event of a spill, it will most likely involve very small amounts of just a few drops of spilled mercury. These smaller amounts may be picked up with mercury absorbent sponges or gently swept into a collection container using a soft bristled DISPOSABLE brush. (Remember to dispose of the brush after use).

Carpet, crevices, and other difficult to clean areas may be cleaned using a mercury absorbent powder that reacts with mercury to form a harmless amalgam.

The suction pump, sponges, and powder are available through laboratory and safety supply companies.

**As a convenience to our customers, a mercury spill kit may be obtained directly from ADC by calling our customer service department toll-free at 1-800-ADC-2670 (p/n 980SK).**

Waste mercury should be placed in a tightly covered container and disposed of in accordance with state and local environmental regulations.

As a convenience to our customers, we can help arrange returns to a waste reclamation facility. Contact our customer service department toll-free at 1-800-ADC-2670 for the necessary packaging supplies and return authorization.

Do not incinerate mercury or mercury compounds or dispose of down the drain.

**Please note:** Liquid mercury combines with many soft metals. Jewelry should be removed prior to cleaning of instruments, or mercury spills. We also recommend the wearing of latex gloves and protective eyewear when cleaning mercury spills.

#### What if a mercury spill should occur and I don't have a spill kit?

Chances are that a spill kit is on the premises. Contact your building's maintenance department. However if you do not have one, they can be ordered from most laboratory safety supply houses. As a convenience to our customers, a basic spill kit can be purchased directly from ADC. Call our customer service department toll-free at 1-800-ADC-2670 and ask for ADC part number 980SK. We will be glad to rush one out to you immediately.

**Please note:** As a precaution, we strongly recommend that you keep a mercury spill kit on hand.

#### Doesn't mercury spill all over the place?

A mercury spill can be cleaned up fairly easily. It rolls into one large bead. It can be cleaned up with any commercially available mercury spill kit specifically designed for this job. When spilled on a hard surface a simple soft bristled brush or a 3cc syringe may even be used to collect very small amounts of mercury quickly and safely. Elemental mercury is a non-wetting liquid. It does not absorb into rugs or fabrics. It can be removed quickly and completely from carpeted surfaces using a mercury absorbent powder that reacts with mercury to form a harmless amalgam which can then be easily contained.

#### Don't I have to report mercury spills and put special hazardous markings on the collection container?

**No.** Mercurial spills of less than one (1) pound are exempt from any Federal, State, or local agency reporting requirements. According to DOT (Department of Transportation) CR49. 173.164 no special markings of any kind are required when dealing with quantities of LESS than 1 pound. ADC DIAGNOSTIX™ instruments contain about 2 ounces of 99.9999% pure elemental mercury.

#### What should I do in the event of accidental eye contact with mercury?

Symptoms of eye exposure can include redness, pain, and watery eyes. If mercury contaminates the eyes, open the contaminated individual's eyes while under gently running water, using sufficient force to open eyelids. Have the contaminated individual "roll" their eyes. Flush the contaminated individual's eyes with running water for a minimum of 15 minutes and seek immediate medical attention.

#### What do I do with the collected mercury and broken instrument?

You have two options. You can dispose of the collected mercury and damaged instrument in accordance with your state and local environmental regulations. Your facility may already have established procedures for the disposal of mercury products. Or, as a convenience to our customers, you can return the waste

