

HEARING INSTRUMENT MODIFICATION & REPAIRS



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Electrostatic Discharge

Static electricity is familiar to all of us as lightning, static cling of clothing, and sparking when we touch metallic objects in cool dry weather.

Static voltages, sometimes exceeding 15,000 volts, can be generated by simple motions such as getting up from a chair, walking across a room, and the rubbing of clothing. Such static voltages can damage electronic integrated circuits. Digital amplifiers are especially sensitive to these stresses.

Typical Voltages

Static discharge from your finger:

To a metallic object: 3500 volts
If you heard it: 6000 volts
If you saw it: 8000 volts

Static electricity can be dissipated on conductive materials by grounding. Grounding is the process of connecting one or more conducting objects to earth ground. The purpose of grounding is to minimize potential differences between conductive and grounded objects.

Some electronic circuitry can be damaged with as little as 30 volts. Damage can range from winding to catastrophic failure. What this means is that if the circuitry has been wounded, the hearing aid may sound perfectly fine, but the performance parameters may be degraded or weakened. It may pass all acoustic parameters but may fail at a later date. Catastrophic failure will degrade the amplifier immediately.

A battery should be placed in the instrument and turned on to its lowest volume level before turning to prevent possible static discharge to the circuit. Unitron Hearing utilizes anti-static flooring, workbenches which are grounded by a table-grounding mat, and employees that wear earth-grounding straps around their wrist to insure instrument performance.

Techniques for Assessing Hearing Aid Function

Hearing aid users do not usually use technical terms to describe their problems and therefore their comments require skilled interpretation. The hearing care professional must identify whether the problem is in the hearing aid itself, the listener's environment, and the user's method of use. expectations or a change in hearing.

It is wise to use a systematic approach when analyzing such complaints. Start with the hearing aid. If no problem is found, investigate the listener's environment for strange noises, difficult listening situations and problem with coping strategies. Troubleshooting should always encompass three different types of examinations. All three types of inspections are important tools and the information obtained from each examination complements the others.

1. Visual Inspection

Carefully examine the appearance of the hearing aid, checking for broken parts, cracks, clogged openings, and battery orientation. A physically damaged hearing aid is a good indication that the internal components are damaged as well.

2. Auditory Inspection

Listen to the sound quality of the signal. Check for adequate amplification and clarity of speech. Internal feedback is usually a result of internal elements striking around inside and external feedback is the result of a poor fit.

3. Objective Inspection

Electro acoustic test equipment can be used to help quantify the hearing aid performance. Component troubleshooting skills also require plenty of practice. By checking hearing aids regularly, the hearing aid professional gains experience in the normal performance of hearing aids.

To develop effective troubleshooting skills, the hearing health professional must know which problems are most commonly expected. A significant number of hearing aid failures are due to wear and tear. Movable parts are subject to wear because they are often used. Microphones, receivers, and volume controls are considered moving parts as well as trimmers and switches. Catastrophic failure of hearing aids is usually due to high voltage sound (noise) is introduced which put them in the moveable parts category. Less than 10% of hearing aid failures are due to solid-state electronic failure. This would include amplifiers, capacitors and resistors.

The following information is offered to assist in troubleshooting the most common hearing aid problems.

Hearing aid openings

Hearing aid openings include the microphone, receiver, ear hook and tubing. Together, they help form the sound channel to direct sound into and out of the hearing aid. These openings can collect skin oils, earwax and moisture which can block the sound channel or simply clog the opening so badly that the sound cannot pass through.

To unclog a plugged opening, gently insert a small drill bit or barbed broach at the edge of the opening and turn clockwise slowly. This will loosen up the wax to be removed.

To remove the broken up debris gently tap the hearing aid upside down until debris falls out. Continue this step until the opening is clear and clean.

Sometimes a clear liquid such as body oil or wax can clog the receiver and it is possible to see the wax or oil under the hearing aid. It may be possible to see the same or microphone opening. To clean the hearing aid, the spout covered by this clear liquid. To remove this film you will need 70% - 90% alcohol and a toothpick. Gently dip the toothpick into the alcohol to create a small bead on the tip of it. Drop the bead into the receiver spout being careful not to soak the hearing aid. Once the bead is in the opening, gently blow on the spout or blowing into the spout will usually remove the bead.

The alcohol will break down the film and clean the screen. If the hearing aid appears dead after doing this then set it aside for 20 minutes to let the alcohol evaporate. Do not use alcohol never water or other chemicals as this can cause rust to occur.

You should NEVER introduce alcohol or any other liquids into microphones for cleaning. This will most likely damage or discharge the charge plate within the microphone.

Batteries and battery related problems

Problems with low battery voltage and poor battery contacts account for a significant proportion of hearing aid problems. The battery's power has an inverse relationship to the age of the battery. Poorly maintained or corroded battery can cause decreased gain and output, poor sound quality and can even cause distortion, buzzing and noise. It is advised to use known-good batteries for testing. You should always include the battery used when sending in an instrument for repair with the above symptoms.



Amplifiers

The amplifier is one of the main components of the hearing aid. The gain of the hearing aid is dependant on the amplifier. The amplifiers can be linear, compression, programmable or multi-band. They are used in the hearing aid above. They are also known as: Hybrids, Circuits and Amps.

Microphones

Microphones receive incoming sound waves and convert the sound waves to electrical impulses. Some hearing aids have two or more microphones which help with directionality of certain sounds. Smaller microphones have a pre-amp built into the casing to help amplify incoming sound waves.

Receivers

Receivers convert the modified and amplified digital or electrical impulses back to acoustic energy (sound waves) that we hear as amplified sound.

Receivers come in different shapes and powers. This power is measured in SSP, which stands for: Saturation Sound Pressure Level.

Hearing Instrument Components

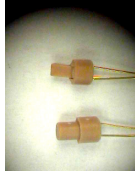
Volume Controls

Volume controls come in many sizes to accommodate the user. 4mm and 6mm are normal but larger caps may be glued on for larger controls. Larger caps may also be used for a screw set volume control.



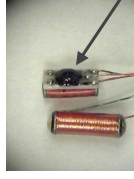
Switches and Pushbuttons

Switches may be used for Telecoil, directional microphones, program and noise suppressant buttons that change programs in a hearing instrument circuit.



Telecoils

Telecoils are tightly wound copper coils that pick up the telephone's inductive signal. If the hearing aid is connected to a typical telephone are eliminated. They may also have pre-amps built in, such as the telecoil on the right.

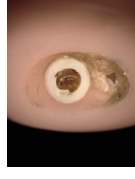


Blocked Wax Guard

A major source of ITE problems is related to blocked receivers. About 80% of ALL ITE fail through you have tried new batteries. If the hearing aid is not working weak, even though you have tried new batteries, it may be the receiver tube is clogged. Most ITEs incorporate some sort of wax protection. The most cost effective way is to use a wax spring.



The spring is inserted into the receiver tube to trap the wax before it reaches the receiver, making for a less expensive repair. Unfortunately, springs become clogged with earwax or other debris, which reduces the output of the hearing aid.



A simple spring replacement in your office often solves the problem. It can be of great help to clinicians if they are able to replace the springs right at their offices, without having to return the hearing aid for repair. The client's confidence in their clinician will improve if he/she can facilitate these simple and routine repairs. Doing this usually takes less time than filling out a repair form and sending back the instrument for repair, keeping everyone happy!

Intermittencies

Determining the cause of an intermittency is one of the most difficult problems for a repair technician to figure out. The hearing health care professional can play a vital role in helping technicians determine the cause of the problem. A good description of the problem can go a long way in speeding up a repair. Try to be specific on repair forms.

Switches and Trimmer Controls

The on-off switch and the volume control are the two components, which may fail due to wear and tear. Trimmer controls such as tone, MPO and AGC sometimes have problems due to under use as there is little to no movement causing the trimmer to become dirty and intermittent.

Check the on-off switch in all positions. With the switch turned on, use the feedback squeal as the test tone and gently wiggle the switch around in its different positions. There should be no intermittency. Be careful not to use excessive force or the switch could become disconnected or intermittent. A good sign that the switch is on its way out is the visual conformation of green corrosion around it.

The volume control should be checked over its entire range. Listen to a soft background noise through the hearing aid and roll the volume dial in both directions from low to high and high to low. Press very gently on the control knob. Does the volume increase or decrease? Does it sound scratchy? If any of these problems are apparent you can try the following. Use a pencil with a pink eraser on the end of it. Place the eraser on the volume control and turn the volume very fast from off to fully on. A good way to do this is to place the hearing aid on a flat surface and use the eraser to push the volume control to the position similar to starting a fire with a stick. Be careful not to turn the volume control 360 degrees when you come to the off and full on positions. Do this for about 2 minutes. This sometimes works in cleaning the volume control contacts and removes dirt on the variable resistor trace inside the volume control. If this does not work then the hearing aid should be sent in for repair.

Trimmers can be tested in the same way but are very hard to clean. If a trimmer is cutting out or sounds scratchy, it should be sent in for repair. Trimmers are tightly sealed units and cannot be cleaned internally.



Trimmers

Trimmers are used to change settings or modify hearing aid responses. Some trimmers are used for tone, MPO, Cut, RRC, MPO and TK. Low Cut, high cut, and MPO. Trimmers can also be used for volume controls on smaller hearing aids.



Receiver Tubing

Receiver tubing may become blocked or damaged. The tubing may need replacing. They are affixed to the receiver spout usually with Cyano Acrylate, a n instant adhesive.

At Leibtron Hearing, our receiver tubes are made of O-flex, which withstands chemical breakdown.

Facoplasts

Facoplasts come in all different shapes and sizes. The most common ones are Full-Shell 3 battery Citi 10A battery Citi 10A battery. There are more facoplasts than these three types, but these are the most common. Facoplasts come in different colors, UV compatible. Tannite is UV compatible.

Blocked Wax Guard

The wax springs can be extracted with tweezers or with a barbed broach.



The barbed broach, a dental tool (used for root canals) can be inserted into the receiver port of the ITE should the spring be lodged too deeply to grab with tweezers. It has barbs that point backwards, so that once it is inserted into the spring it can be pulled back, taking the dirty spring along with it.



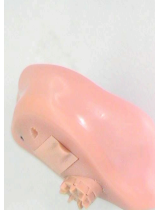
Caution should be used to avoid tearing the wall of the receiver tubing with this tool. A magnifying glass or microscope may be helpful.



To insert a new wax spring: Place the new spring on the end of a tweezers, and gently push the wax spring into the receiver tube in the original location of the old spring.

Cerumen Related Repair

First determine if instrument's failure is cerumen related, if so can you extract the wax from the tubing? Is the wax guard blocked? Is the tubing degraded or pinched in? If it is not cerumen related, the instrument has other problems, you might want to send it in for repair. If your evaluation indicates you must replace the receiver tubing, move to step 1.



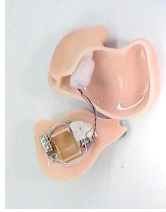
Step 1
Now you will need to determine where the seam line is. This is where the faceplate and shell meet, you will have to cut the tubing back here. The safest area to open a hearing aid is usually on the rim of the Concha or the backside of the instrument usually because there is no curvature in this area.



Step 2
The instrument has a shiny, lacquer finish you will need to remove the lacquer from the seam line with an abrasive tool. This will keep from cracking the shell or faceplate. Line up the tip of the razor blade with the seam and cut through the tubing as you rock the tip of the blade into the seam. Do not try to saw the seam open, as this will damage the faceplate. Once the blade has cut through the tubing, apply it a little twist and listen for a cracking sound, this indicates the seam is opening up. Follow along the seam line to continue the splitting, if necessary.

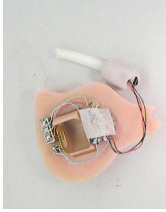
Step 3

Put the instrument in open, lay back at the concha inside and their orientation. This is important because you will want to put the receiver back in the same place when you close the hearing aid especially important in quelling internal feedback.



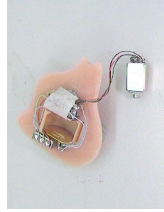
Step 4

Place your tweezers under the receiver gently pull the receiver out of the tubing. Pull it out as far as you can without pulling the tubing as this can damage the casing and cause permanent feedback. If you cannot get behind the receiver then push or drill the tubing at the canal tip outside of the shell.



Step 5

Remove any glue or tubing with 15A diagonal cutters or a razor blade. Clean around the receiver spout. The casing is not to be cut. If the casing is cut, the instrument has to go back for repair. The spout cannot be glued back on. The spout needs to be free of tubing and glue. It should be shiny. This will insure a good bond for the tubing.



Removal Filament Replacement/Repair

Removal handles aid in removing the hearing aid from the ear. CICs are deeply inserted into the ear canal and users would have great difficulty removing them without a handle.

Sometimes removal handles were not installed; break off, the beads fall off or in rare instances barbers have been known to cut them off confusing them with thick hairs.

A simple handle installation, replacement or repair in-office is easy with the correct tools and techniques. Providing this service not only enhances the client/clinician relationship through improved confidence, it is also much more cost effective than sending the instrument back to the manufacturer for repair, (keeping everyone happy!)

Tools needed are:

- Three ounce waxed Dixie cup
 - Fun Tak Hearing Part # 021-5011 \$2.90
 - **Removal Handle Repair Kit**
 - Unifon Hearing Part # 054-5162 \$12.00
- Kit includes: Crazy glue, fishing line, gold pin vise, #75 drill bit, and 1 vial of repair powder.



Place a three ounce waxed Dixie cup upside down. This will provide a recessed surface for your materials. Wax coated cups will not absorb the Crazy glue like paper cups do. Stick a small piece of FunTak against the side of the cup and about 6 drops of Crazy glue against the other edge. This step is important because the powder and glue cannot touch. Keep them separate.



Step 9
Once the seam has cured we will listen for internal feedback.

Block off the end of the receiver tube and the top of the vent with Fun Tak. The Fun Tak should be packed to volume and place close to your ear.

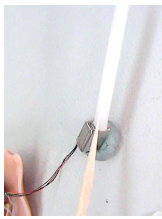
Do not cup the instrument, as feedback will happen. If no feedback is present, glue the tube in place. If feedback is present, cut the receiver tube in or out until the feedback cannot be heard.

Final Step

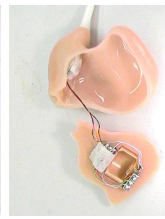
If you are confident that the aid does not have internal feedback, cut the remaining tube off flush with the canal tip with a razor blade. Buff the remaining tubing with a fine sandpaper. For extended receiver tubes, cut the tube to the desired length.



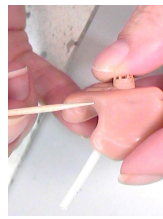
Step 6
Place the receiver tube over the spout and push it against the receiver housing. Apply Crazy glue around the tube and receiver. Re-apply more glue around tube if needed. If immediate curing is desired.



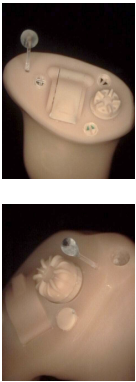
Step 7
Place a sharp angle on the receiver tube to help it fit smoothly into the canal opening. Orient position of the receiver as closely as possible to when you opened the shell.



Step 8
The faceplate with the shell and be certain there are no ridges or gaps. The faceplate should rest on the shell perfectly. Apply slight pressure on the faceplate and run a bead of Crazy glue on both the shell and faceplate. The receiver tube should not be glued yet, it should move freely so that we can adjust it for mechanical feedback.



Removal Filament Replacement/Repair



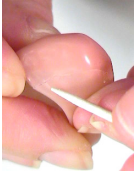
Using a pin vice and a #75 drill bit, slowly drill clockwise into the faceplate in a circular motion until you reach the filament. Do not drill too deep into the shells, this would be just below the volume control and above the vent. On canals, placement will be by the microphones opposite the vent. Drill slowly until you feel the drill go through the faceplate. Turning clockwise slowly remove the drill and the debris it has cut away from the plate.



Cut a piece of 25 lb test fish line about 2 inches long. Cut the end on an angle. Cutting the end of the line on an angle will aid in the insertion into the drilled hole. Insert the cut line into the freshly drilled hole of the faceplate. If it does not go in smoothly, re-drill the hole to make certain there is no debris left from your initial drilling.

Place the angled end of the fish line into the Krazy glue, making certain you have a drop of glue on the end of it. Slowly insert the fish line into the drilled hole; this will carry the glue down into the hole. Allow line to dry for a few seconds and try to remove by gently pulling on it. If the line pulls out repeat this step.

Acrylic Shell Repair



Evaluate the type of damage. Shells that show signs of fracture or are actually broken in half can be fixed easier if the shell is separated from the faceplate. It is possible to fix a fractured shell while the faceplate is still attached but the finished result may not be as appealing as the open shell repair.



Using a 3 oz waxed Dixie cup, separate pink powder and crazy glue in two separate mounds.

Place the toothpick into the glue, then the powder and back into the glue. First and last steps are glue with powder in between.

If the bead of material is not large enough, repeat until desired amount is achieved. Consistency should be like honey.

Use this process for both cracked and hole in shell repair.

Removal Filament Replacement/Repair

Cut the inserted fish line to the desired length. This may mean that you place the hearing aid in the client's ear and cut the fish line to the desired perfect length. Once cut, the fish line is ready for the bead.



To create a bead, dip the end of the line in glue then into the white powder. Then repeat this step until you have a bead of material. The size of the bead size is not, usually two to three times. The first and last step is into the glue.



Place the hearing aid upside down against the FunTak allowing the bead to dry naturally, usually about 15 to 30 minutes. Adhesive accelerator may be used to speed up the drying process. Use the accelerator to quickly. Allow the bead to dry for 1 minute before dipping in accelerator.

Place the bead of patch material directly in the hole or crack. The hole should be smoothed and the edges should be smoothed. If the hole is large, use the accelerator is not used, allow to dry before applying more material. Repeat this step until the patch is at shell contour level. Grind & buff off any excess material.

If the hole or crack is too big for the material to hold on its own, use tape to cover the outside of the shell with the material. Use beige Micro-Pore surgical tape, as this will match the shell color best.

For broken or extremely damaged shells, send back to the manufacturer for repair or remake.

UV Shell Patching

Simple in-office shell patching is quick and easy with the correct tools and technique, is faster and more cost effective than sending the instrument back to the manufacturer for repair, keeping everyone happy!

Tools needed are:

- Small ball burr
- Krazy glue
- Desired color high viscosity UV resin.
- UV lamp

The following instructions are for UV resin shells.

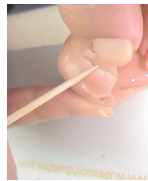
Cracked shells

1. Grind along cracked area with a small burr, as thin as possible without going through the shell. It should look similar to a trench too much glue
2. Apply a small amount of Krazy glue along the crack. Do not apply the toothpick slightly, will keep the ball from falling off
3. Dispense UV resin onto the end of toothpick to form a ball. Rotating the toothpick slightly, will keep the ball from falling off
4. Place shell into UV chamber until cured, usually about 2 minutes
5. Grind off any excess material flush to the shell, using a small burr
6. Buff hearing aid until you obtain a smooth surface

Hole in shell

1. Round the opening of the hole with a small burr
2. Dispense UV resin onto the end of toothpick to form a ball. Rotating the toothpick slightly will keep the ball from falling off
3. Apply the material in a circular motion to fill the hole.
4. Grind off any excess material flush to the shell, usually about 2 minutes
5. Fill void with more material if needed

Acrylic Shell Repair



To fix a fracture in a shell, you will need to open it so that the patching material will flow into the fracture and not just cover up or give the illusion of a fixed shell. Getting the material into the fracture will guarantee a strong patch. Place the material into the fracture and use a Q-Tip to remove the material from the problem area and wipe the excess away with a Q-Tip, which will aid in buffing the repair.



6. Grind off any excess material flush to the shell, using a small burr
7. Buff hearing aid until you obtain a smooth surface

Battery Door Hinge Repair

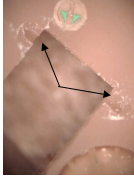
A broken battery door hinge pin can be a costly repair especially if the repair is done by a technician. The repair can be done by you. The replacement will have to be replaced along with any trimmers, volume control, program sockets and switches.

The hinge pin can be replaced with ordinary office supplies and is faster and less expensive than sending the instrument in for repair, keeping everyone happy!

Tools needed are:

- Hinge pin, standard staple (from your office stapler) or Dritz flower top hinge pin (preferred), if a larger hinge pin is needed.
- Round tooth picks
- Crazy glue
- Desired color acrylic powder
- Adhesive accelerator (optional)

If the hinge pin has not been lost, you can re-use the pin. If the hinge pin has been lost, you can use a standard Swingline staple from your office stapler. If a larger hinge pin is needed, use a Dritz Quilting Pin. Cut the staple or quilting pin to length with tempered wire cutters.



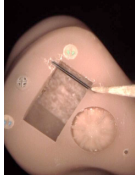
Step 1
Identify the damaged area of any remaining debris.



Step 2

Using a pair of stout tweezers, place the hinge pin, shortened staple or shortened quilting pin into the damaged area. Push each corner of the pin in firmly.

Battery Door Hinge Repair



Step 3

Apply a small amount of Crazy glue with a toothpick at each end of pin



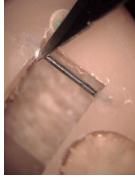
Step 4

Place the end of the toothpick into Crazy glue, then desired color Acrylic powder, and then Crazy glue creating a ball of material.



Step 5

Apply the ball of material to each end of the pin or staple.



Step 6

Allow to dry naturally until hard to touch (usually 30 minutes) or use an adhesive accelerator to cure immediately.

Step 7

Scrape off any excess glue from pin or staple with scalpel until battery door snaps into place.

COMMON M.S.D.S. TERMS

ACUTE EFFECT - An adverse effect with severe symptoms occurring very quickly, as a result of a single excessive exposure to a substance.

ACUTE TOXICITY - The adverse effects resulting from a single excessive exposure to a substance. Usually a figure denoting relative toxicity.

ASPHYXIANT - A vapor or gas that can cause unconsciousness or death by suffocation. Most are associated with a lack of oxygen to promote life.

BOILING POINT - A temperature at which a liquid turns to a vapor state. This term is usually associated with the temperature at sea level pressure when a flammable liquid gives off sufficient vapors to promote combustion.

"C" or CEILING - In terms of exposure concentrations, this is the number that should never be exceeded for a short period, for a substance.

CARCINOGEN - A substance or agent capable of producing cancer in mammals.

"cc" or CUBIC CENTIMETER - A volume of measurement usually associated with small quantities of a liquid. One quart has 946 cubic centimeters.

CHRONIC EFFECT - An adverse effect with symptoms that develop or recur very slowly, or over long periods of time.

CHRONIC TOXICITY - The adverse effects resulting from prolonged or repeated exposure to a substance, such as an indicator of relative toxicity for exposures over great lengths of time.

COMBUSTIBLE - A term used to classify liquids, gases, or solids that will burn readily. This term is often associated with "flashpoint", which is a temperature at which a given material will generate sufficient vapors to promote combustion.

CONCENTRATION - A figure used to define relative quality of a particular material. Such as a mixture in air 5 ppm Acetone in air.

CORROSIVE - A material with the characteristic of causing irreversible harm to human skin, or steel by contact. Many acids are classified as corrosives.

DECOMPOSITION - The breakdown of materials or substances into other substances or parts of compounds. Usually associated with heat or chemical reactions.

COMMON M.S.D.S. TERMS

DERMAL - Used on or applied to the skin.

DERMAL TOXICITY - The adverse effects resulting from exposure of a material to the skin. Usually associated with lab animal tests.

EVAPORATION RATE - The rate, at which a liquid material is known to evaporate. The sooner it will become concentrated in the air, creating either an explosive/combustible mixture or toxic concentration, or both.

FLASH POINT - The temperature at which a liquid will generate sufficient vapor to be ignited immediately, the lower the flash point, the greater the danger of combustion.

FLAMMABLE - any liquid that has a flash point of 100 Degree F. or below. Also any solid which can sustain fire and igniter readily.

GENERAL EXHAUST - A term used to define a system for exhausting or ventilating air from a general work area. Not a site specific, as localized exhaust.

"g" or GRAM - A unit of weight. One ounce equals about 28.4 grams.

HAZARDOUS CHEMICAL - Any chemical which is either a physical or health hazard or both.

IGNITABLE - A term used to define any liquid, gas or solid which has the ability to be ignited which means having a flash point of 140 Degree F., or less.

INCOMPATIBLE - Materials which could cause dangerous reactions from direct contact with one another.

INGESTION - Taking in a substance through the mouth.

INHALATION - The breathing in of a substance in the form of a gas, liquid, vapor, dust, mist, or fume.

INHIBITOR - A chemical added to another substance to prevent an unwanted change from occurring.

IRRITANT - A chemical which causes a reversible inflammatory effect on the site of contact however is not considered a corrosive. Normally, irritants affect the eyes, skin, nose, mouth, or respiratory system.

COMMON M.S.D.S. TERMS

"LC" or LETHAL CONCENTRATION - In lab animal tests, this is the concentration of a substance which is sufficient to kill the animal.

"LD50" or LETHAL CONCENTRATION 50 - In lab animal tests, this is the concentration of a substance required to kill 50% of the group of animals tested.

"LD" or LETHAL DOSE - The concentration of a substance required to kill the lab animal for the test with a specific material.

"LD50" or LETHAL DOSE 50 - The single dose concentration of a substance required to kill 50% of the lab animals tested.

"LEL" or LOWER EXPLOSIVE LIMIT - The lowest concentration, or percentage in air, of a vapor or gas, that will produce a flash fire when an ignition source is introduced

LOCAL EXHAUST - The system for ventilating or exhausting air from a specific area such as in welding operations. More localized than general exhaust.

MELTING POINT - The temperature at which a solid changes to a liquid.

"mg" or MILLIGRAM - A unit of measurement of weight. There are 1000 mg in one gram of a substance.

"mg/m3" or MILLIGRAMS PER CUBIC METER - A unit of measurement usually associated with concentrations of dust, gases, or mists in air.

"MPPS" or MILLION PARTICLES PER CUBIC FOOT - A unit of measure usually used to describe airborne particles of a substance suspended in air.

MUTAGEN - A substance or agent capable of altering the genetic material in a living cell. Normally associated with carcinogens.

NFPA - NATIONAL FIRE PROTECTION ASSOCIATION - An organization which promotes fire protection, prevention, and establishes safeguards against the loss of property and/or life by fire. The NFPA has established a series of codes identifying hazardous materials by symbol and number for use in labeling and safety data sheets. The codes are based on the material's flammability, with 0 being not burnable up to 4 which means will burn spontaneously at room temperature.

OLFATORY - Relating to the sense of smell.

COMMON M.S.D.S. TERMS

ORAL - Used in or taken through the mouth into the body.

ORAL TOXICITY - A term used to denote the degree at which a substance will cause adverse health effects when taken through the mouth. Normally associated with lab animal test.

OXIDIZER - A substance which yields oxygen readily to stimulate the combustion of an organic material.

OXIDIZING AGENT - A chemical or substance which brings on oxidation reactions, by providing the oxygen to promote oxidation.

PEL or PERMISSIBLE EXPOSURE LIMIT - An exposure concentration established by the Occupational Safety & Health Community which indicates the maximum concentration of which no adverse effects will follow.

PPM or PARTS PER MILLION - A unit of measurement for the concentration of a gas or vapor in air. Usually expressed as number of parts per million parts of air.

PPB or PARTS PER BILLION - As above, only expressed as number of parts per billion parts of air.

REACTIVITY - The term which describes the tendency of a substance to undergo a chemical change with the release of energy, often as heat.

REDUCING AGENT - In an oxidation reaction, this is the material that combines with oxygen.

RESPIRATORY SYSTEM - The breathing system, including the lungs, and air passages, plus their associated nervous and circulatory components.

SENSITIZER - A substance which on first exposure causes little or no reaction, but with repeated exposure will induce a marked response not usually limited to the exposure site. Usually associated with skin sensitization.

SPECIFIC GRAVITY - The weight of a material compared to the weight of an equal volume of water. Usually expresses a material's heaviness. A material with a specific gravity of less than 1.0 will float on water, whereas a material with a specific gravity of less than 1.0 will float on top of water.

COMMON M.S.D.S. TERMS

STEL or SHORT TERM EXPOSURE LIMIT - The maximum allowable concentration of a substance that can be inhaled for less than 15 minutes and not produce adverse health effects.

TERATOGEN - A substance or agent, usually associated with cancer, that when exposed a pregnant female will cause malformation of the fetus. Usually associated with lab animal tests.

TLV or THRESHOLD LIMIT VALUE - A term used by the Occupational Safety & Health community to describe the airborne concentration of a material to which nearly all persons can be exposed to day in and day out, and not develop adverse health effects.

TOXICITY - The sum of adverse effects of exposure to materials, generally by mouth, skin, or respiratory tract.

TWA or TIME WEIGHTED AVERAGE - The airborne concentration of a material to which a person can be exposed over an 8-hour work day. (An average).

UEL or UPPER EXPLOSIVE LIMIT - The highest concentration of a gas or vapor in air that will sustain or support combustion, when an ignition source is present.

VAPOR DENSITY - A term used to define the weight of a vapor or gas as compared to the weight of an equal volume of air. Materials lighter than air have a vapor density of less than 1.0, whereas materials heavier than air have a vapor density greater than 1.0.

VAPOR PRESSURE - A number used to describe the pressure that a saturated vapor will exert on top of its own liquid in a closed container. Usually, the higher the vapor pressure, the lower the boiling point, and therefore the more dangerous the material can be, if flammable.

VENDOR LIST

Hearing Related Tool & Supply Companies

Warner Tech-Care
3255 Spring St. NE.
Minneapolis, MN 55413
800-328-7752
866-548-1811
www.warnerhearing.com

Kingwood Industrial Products
10000 W. 11th St.
Hackensack, NJ 07640
908-852-8655
<http://www.kingwoodindustrial.com>

VanB Enterprises

Hearing Aid Sweatband
9905 Rock Springs Rd.
West Valley, IN 14171
716-842-8111
716-842-9319 fax
<http://www.vanbenterprises.com>

"First Aid" for Hearing Aids
Dip-Coat Canal Build Up
10000 W. 11th St.
Plymouth, MN 55441
800-230-4034
763-545-4171 Fax

Advanced Hearing Technologies
Jodi-Pro Wax Vacuum
PO Box 18232
Portland, OR 97218
866-856-5634
503-287-8408 fax

**UNITRON HEARING
AID REPAIR TOOLS**

Part number	Description	Price
026-5438	Barbed Broach (minimum order 10)	\$1.00 ea
026-5487	Gold Pin Vise (drill handle)	\$6.00
026-5408	#75 Drill Bit	\$3.00
026-5497	15 A Cutting Tweezers	\$30.00
021-5190	Single Edge Razor Blades (pack of 100)	\$6.00

Repair Kits

Hearing Instrument Repair Pouch
Includes: 15-AP Cutting Tweezers, flush cutter, Crazy glue, #75 drill bit, leather finger guard, barbed broach, single edge razor blade, 2 vials of acrylic repair powder and instructions.
\$65.00

Removal Handle Repair Kit
Includes: Crazy glue, fishing line, gold pin vise, #75 drill bit, 1 vial of repair powder and instructions.
\$12.00

Supplies

Microphone Tape (roll) \$4.50
Receiver Tubing Straight (paid of 100) \$30.00
Crazy Glue Tubing 1 meter \$5.00
Buffing Compound (1.5lb bar) \$5.00
Pain Tak (per inch) \$2.50

NOTES