

Handling of Transducers

Introduction

Transducers, although robust, have limits to chemical exposure and excessive handling.

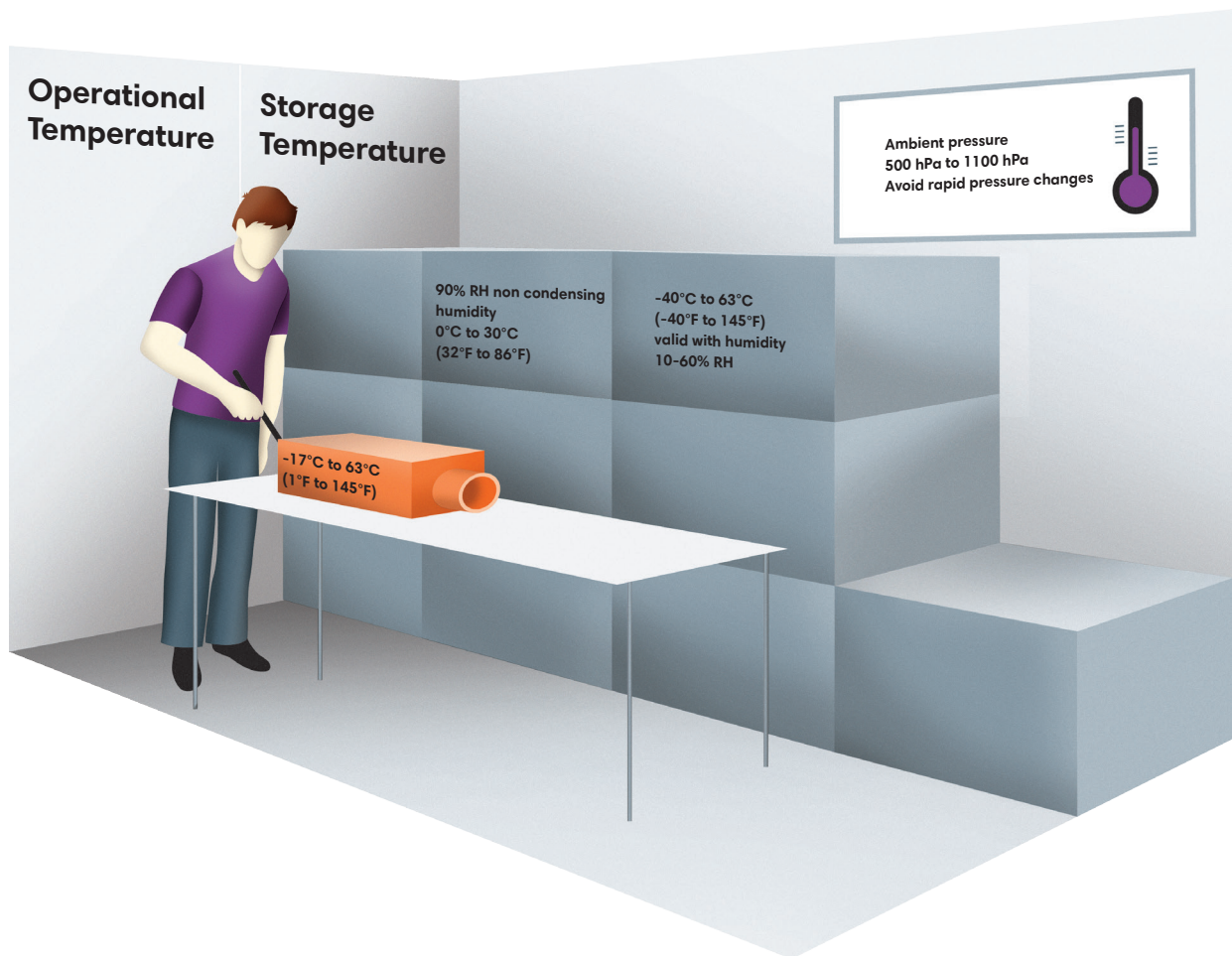
Some examples of improper handling may be:

- Physical Dropping (excessive mechanical shock)
- Rough Handling
- Using harmful cleaning solvents
- Electro Static Discharge - ESD

These mishandling processes may cause dents, loss of sensitivity or output, distortion, external leaks, and damaged screens. All this can be prevented if the correct tools, fixtures and ESD protection are used and handling instructions are followed.

Storage and operational conditions

- Storage temperature range: -40°C (-40°F) to 63°C (145°F) (valid with humidity range: 10-60 % RH)
- Storage temperature range with 90 % RH non condensing humidity: 0°C (32°F) to 30°C (86°F).
(It is not recommended to store microphones at 90 % RH and high temperatures)
- Operational temperature range: -17°C (1°F) to $+63^{\circ}\text{C}$ (145°F)
- Ambient barometric range during storage: 500 hPa to 1100 hPa (Avoid rapid pressure changes)



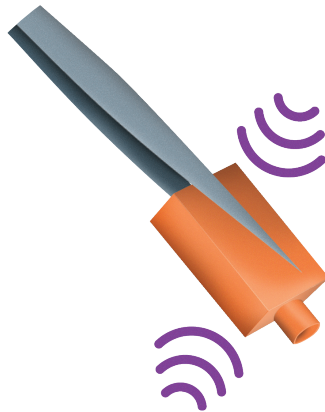
Microphone handling guidelines

Soldering

Soldering can be harmful for microphones if not done correctly. See section about soldering instructions for more details.

Forceful squeezing

During the handling of the microphone with sharp tweezers it is possible to dent the side of the can if too much force is used. This will cause dents on the side of a transducer, which may cause internal damage and loss of sensitivity. Too much pressure on the case of the product can destroy the product. Caution should be used when picking up the microphone.



Use of Liquid Chemicals

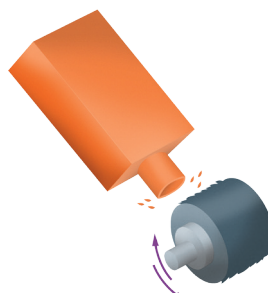
Please also use caution when cleaning the microphone to prevent any liquid chemicals from entering inside the microphone. For example, chemicals like Isopropanol can be destructive to the internal operation of an electret microphone. It can cause discharge of the backplate or stiffening of the membrane, which results in a drop in microphone sensitivity.

See list of allowed chemicals at the end of this document for more details.



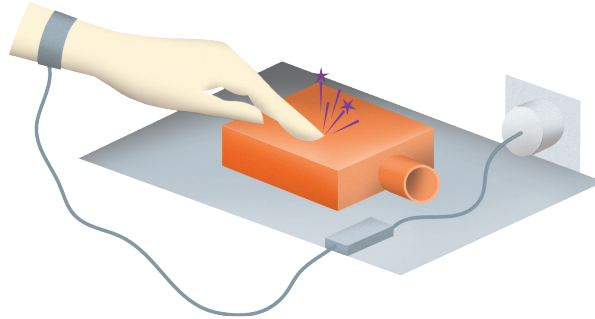
Buffing

Buffing down an instrument is a very common practice in manufacturing processes. The small particles from the buffing compound may get inside a transducer altering its sensitivity. Please cover up the sound inlet while buffing or cleaning the hearing aid instrument.



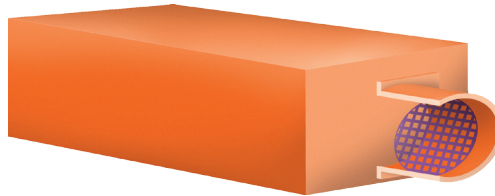
Electrostatic Discharge

Microphones contain hybrids inside which may be susceptible to electrostatic discharge. Our microphones have been designed to a Class 2 or 3 protection level according to the MIL-STD-750D. The use of ESD protection such as wrist straps or ESD matting, however, is still recommended



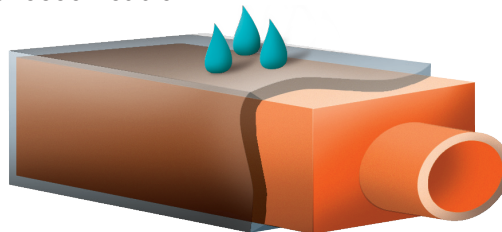
Removing residue from screens

Screens are fragile. Dented screens or plugged up screens will cause decreased output. Use care when removing residue from screens.



Nanocoating

Nanocoating may cause charge loss of the backplate resulting in a lower sensitivity of the microphone. Closing the sound inlet during nanocoating is the most safe solution. Sonion 8000 microphones and the 6500/5000 NCR versions are nanocoat resistant.



Ultrasonic welding

When ultrasonic welding of an application with the 8000 microphone is considered, it is recommended to contact Sonion for technical assistance. Other microphones are fully compatible with ultrasonic welding processes.

Recovery

If a microphone needs to be removed for recovery, it should not be pulled by soldered leads, nor should it be pushed on the cover. Extra care should be taken when removing the 8000 microphone. Be careful not to push on the pcb, but only on the metal case.

Mounting

During the mounting of the microphone in the faceplate we recommend not to press the microphone with sharp tweezers from the solder pad side. Extra care should be taken when mounting the 8000 microphone. Be careful not to push on the pcb, but only on the metal case.

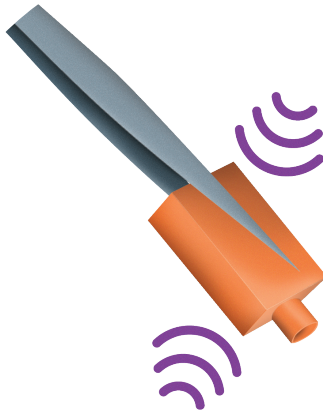
Receiver handling guidelines

Soldering

Soldering can be harmful for microphones if not done correctly. See section about soldering instructions for more details.

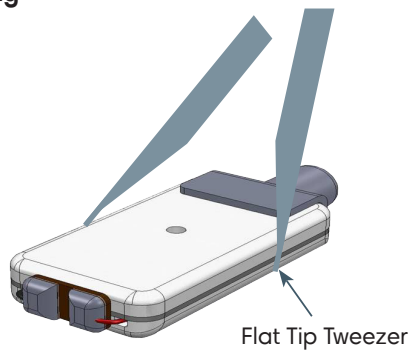
Forceful squeezing

This will cause dents on the side of a transducer, which may cause distortion and external leaks

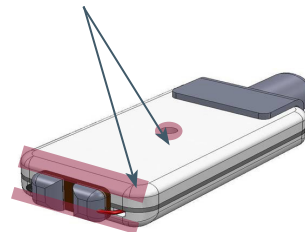


Extra care should be taken when using the 4100 and 4400 receivers. Due to the small size and internal construction these receivers are less robust to mechanical stress than other receivers.

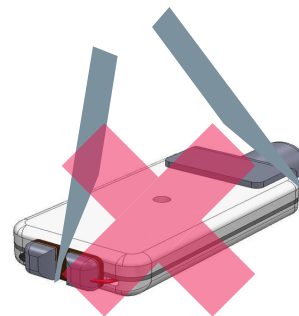
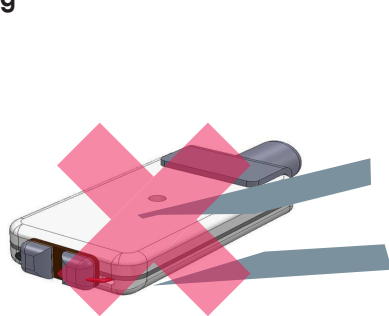
Correct handling



Do not touch red area with sharp tweezer points



Incorrect handling



Use of Liquid Chemicals

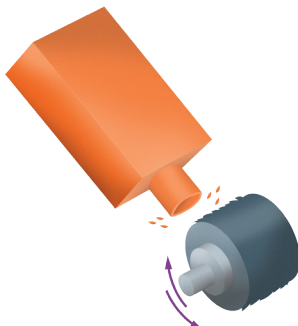
Please also use caution when cleaning the receiver to prevent any liquid chemicals from entering inside the receiver. For example, chemicals like Isopropanol can be destructive to the internal operation of a receiver. It could for example cause a stiffening of the receiver membrane, resulting in a lower output or dead receiver.

See the list at the end of this document for more details on chemicals.



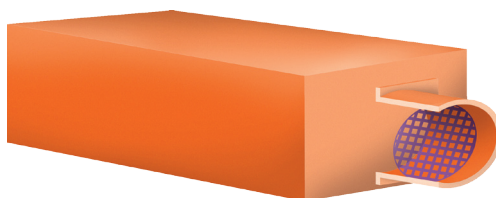
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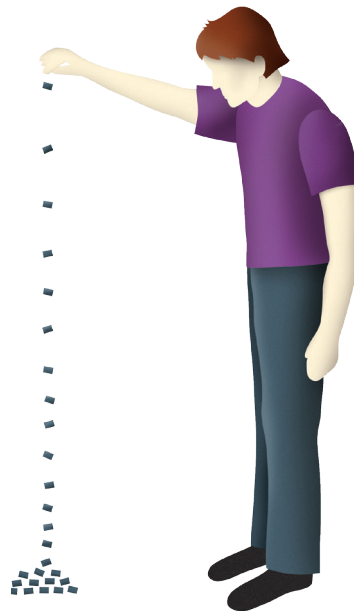
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Dropping

This may cause internal damage to a receiver and dents causing distortion or external leaks.



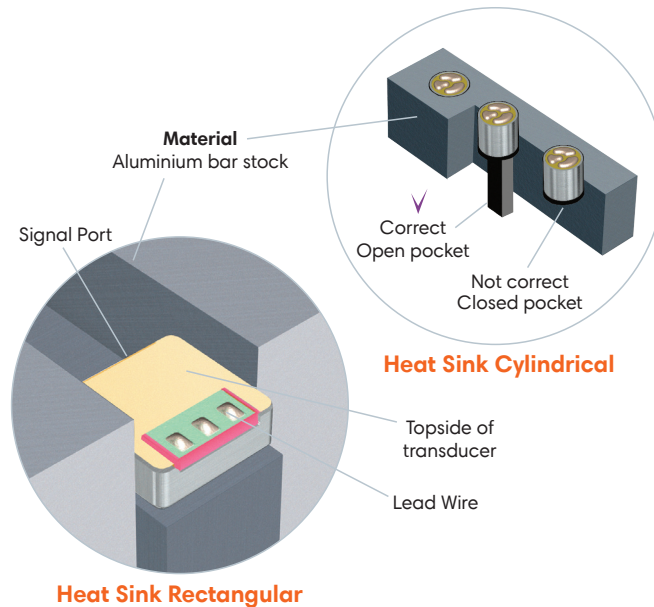
Soldering Instructions

Warning: When soldering on the transducer the spout (of a receiver or microphone) must not be blocked. This is to prevent pressure increase due to expanding air.



Step by step instructions

1. Place the transducer in a heat sink with terminal pads facing up. Sonion highly recommends using heat sinks to dissipate the heat from the transducers (see pictures). When placing a transducer in a heat sink fixture, it is important not to apply excessive force to the sides. This may cause damage.



An alternative way to dissipate the heat from the transducers is to use a metal double sided tape on a metal block, provided that the sound inlet/outlet is not closed during the soldering. We recommend using this only if there are no alternative options and it should be done by experienced operators. Especially in critical situations like matched pair microphones the risk of creating a mismatch is higher than when using a full heat sink, as only one side of the microphone is conducting heat away.

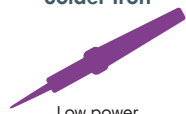



2. Dip the pretinned part of the wire in liquid rosin flux. Avoid excessive flux residue.
Use of flux is recommended, but not required
3. Lay tinned tip of wire on terminal pad.
4. Clean soldering iron tip on wet cellulose sponge.
5. Apply soldering iron tip to the wire and terminal pad simultaneously.
6. Keep soldering iron tip in contact with wire and terminal pad until solder flows and make a good connection. The total time that the soldering iron tip is in contact with the wire and terminal should not exceed one second, and the temperature of the microphone should not exceed 80°C (176°F). Remove solder iron tip and hold wire in place until solder solidifies.
In general it is safe and highly recommended to verify that solder terminal pads are melted one-by-one and that the soldering iron tip is removed just before a neighboring pad starts to melt. The allowed soldering time before this happens may vary depending on the amount of heat-drain by other components present, e.g. PCBs or wires. Melting more terminal pads simultaneously might damage the microphone.

7. Inspect connection to see that:

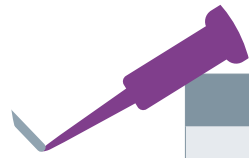
- a. Solder has flowed smoothly over wire and terminal pad
- b. Solder has not bridged between adjacent terminal pads or between the terminal pad and the case.



Recommended equipment

 <p>Solder Iron</p> <p>Low power (25-60 Watts) with temperature control</p> <p>ESD safe</p> <p>Smallest tip possible</p>	 <p>Flux</p> <p>Lead Free compatible, no-clean flux</p> <p>Only add flux when needed</p> <p>Can be added to the solder pad or the connection wire</p>	 <p>Solder material</p> <p>SAC305 with 1 - 2.2% flux (Sn 97.5%/Ag 3.0%/Cu 0.5%)</p> <p>Diameter 0.25 - 0.50 mm</p>	 <p>Soldering Time</p> <p>Solder pads: 1 sec. (Max: 2 sec.)</p> <p>Dwell time: 10 sec. between solder operations</p> <p>Wires: 3 sec. (Can increase when wires are held with tweezers)</p>
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Soldering Specifications



	Soldering Temperature		Soldering Iron Tip Size	
	Celsius	Fahrenheit	mm	inches
Mic 100	340 - 350°C	644 - 662°F	0.2 - 0.8	0.008 - 0.031
Mic 5000	280 - 340°C	536 - 644°F	0.2 - 0.3	0.008 - 0.012
Mic 6000	350 - 400°C	662 - 752°F	0.2 - 0.6	0.008 - 0.024
Mic 6500	280 - 340°C	536 - 644°F	0.2 - 0.3	0.008 - 0.012
Mic 8000	350 - 370°C	662 - 698°F	0.2 - 0.6	0.008 - 0.024
Mic 9000	350 - 400°C	662 - 752°F	0.2 - 0.6	0.008 - 0.024
Rec/TC	350 - 380°C	662 - 716°F	0.2 - 0.6	0.008 - 0.024

Chemical



	Description	Usage
Adhesive	Super glue cyanoacrylate* (e.g. Cyanolit, Loctite 408, Loctite 416)	
	2 component polyurethane (e.g. Conap EN-20)	●
	2 component epoxy resin (e.g. Scotchcast resin 3)	
	Silicone mastic acetic acid free, alcohol based	
	Silicone mastic based on acetic acid curing* (e.g. Loctite 18198, GE RTV118)	●
	Super glue cyanoacrylate (e.g. Loctite 420)	
	Super glue ethyl cyanoacrylate (Adhesive Systems SI5)	●
	Clear universal adhesive based on polyvinyl acetate (e.g. Bisoncol)	
Solvent	Aquaous rosin cleaner* (e.g. Alpha 2110)	●
	2 - Propanol (Isopropanol)*	●
	Acetone	
	Dry-Cleaning naphtha	●
	Methylen chlorid	
	Methylated spirit	
Other	Conformal coating polyurethane ologomer mixture* (e.g. Dymax 986)	●
	Moulding compound based on urethane acrylate (e.g. Loctite 21365)	
	Monomer (shell material)*	●
	Accelerator/Activator for super glue (e.g. Loctite 7452)	●

* Avoid saturated vapour levels ● Safe ● Critical, preferred not to use ● Do not use