The Art of Custom Hearing Instrument Manufacturing 2017

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Employed With	Home Base	Current Job Position	Years in Industry	History
• Unitron USA	• Plymouth, Minnesota	• Director of Operations	• 23	• Lori Medical Laboratories • Argosy Electronics • Unitron • Sonova

What are custom products?

Unitron
custom products
reference guide

Custom Hearing Instruments

Full shell

Unitron full shell custom products are designed for patients with mild to profound hearing losses. Full shell devices provide natural sound quality and are recommended for patients who require maximum retention, ergonomics, ease of insertion/removal, long battery life and options such as a telecoil, volume control or push button.

Canal and half shell

Unitron canal and half shell custom products are designed for patients with mild to severe hearing losses. Canal and half shell devices provide natural sound quality and are recommended for patients who are concerned about cosmetics and need the benefits of custom options, such as a directional microphone, volume control or push button.

Mini canal

Unitron mini canal custom products are designed for patients with mild to severe hearing losses. Mini canal devices provide natural sound quality and are recommended for patients who have cosmetic concerns but require the benefits of a directional microphone and other options, such as a volume control.

Completely-in-the-canal

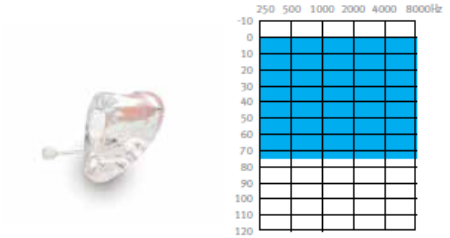
Unitron completely-in-the-canal custom products are designed for patients with mild to severe hearing losses. CIC devices provide natural sound quality, as well as wind noise reduction and improved directionality due to the location of the faceplate behind the tragus. CIC devices are recommended for patients who are looking for a cosmetically discreet solution, yet would like some manual control, such as a push button.

Invisible-in-the-canal

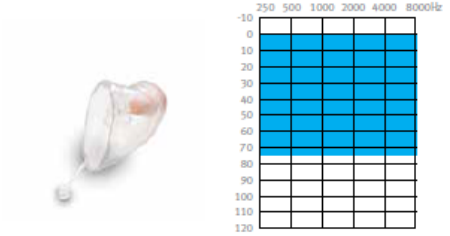
Unitron invisible-in-the-canal custom products are designed for patients with mild to moderate hearing losses. IIC devices provide natural sound and enhanced directionality due to the recessed faceplate. IIC devices are recommended for patients who have cosmetic concerns and are looking for a “fit-and-forget” solution.

Custom EarMolds and SDS

Sound Delivery System

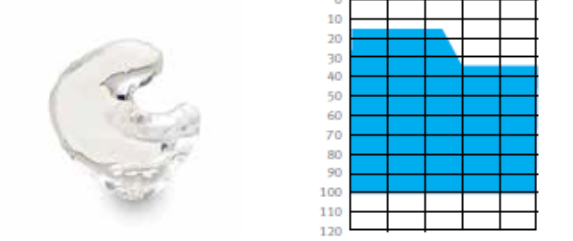


Solid sleeve mold – For RIC devices or slim tubes; recommended for mild to severe hearing losses. Available in acrylic, silicone and soft silicone.

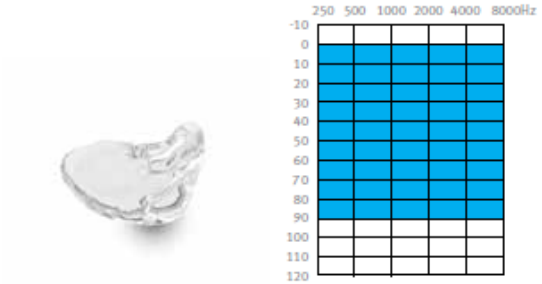


Hollow sleeve mold – Recommended for mild-to-moderate hearing losses. Can be used with either RIC technology or slim tubes. Available in acrylic.

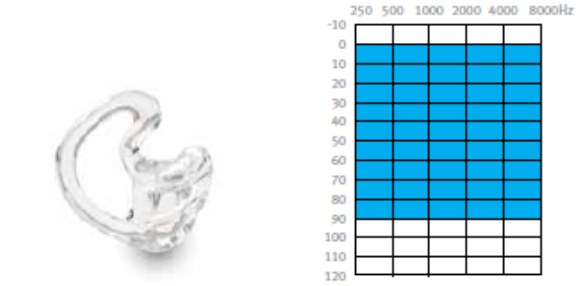
Earmolds



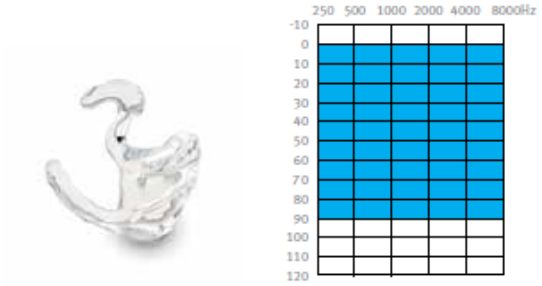
Full shell – Provides maxiumum retention; recommended for mild to profound hearing losses. Available in acrylic, silicone and soft silicone.



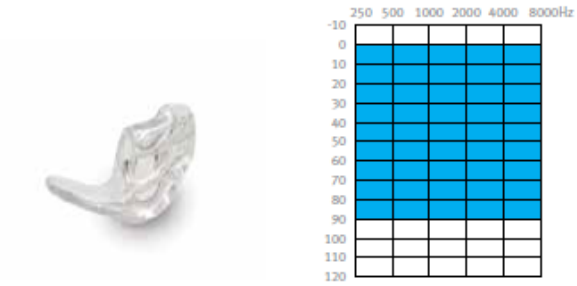
Half shell – Provides good retention; recommended for mild to severe hearing losses. Available in acrylic, silicone and soft silicone.



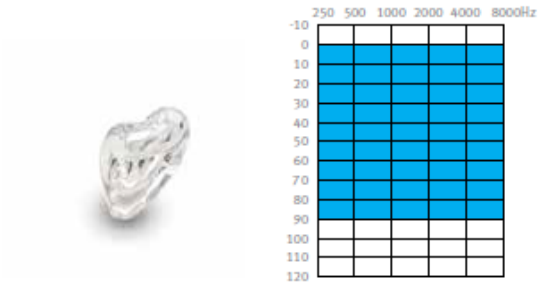
Skeleton – A cosmetic solution with good retention; recommended for mild to severe hearing losses. Available in acrylic and silicone.



Semi-skeleton – A cosmetic solution with retention; recommended for mild to severe hearing losses. Available in acrylic and silicone.



Canal lock – A cosmetic solution when retention is required; recommended for mild to severe hearing losses. Available in acrylic and silicone.



Canal mold – A cosmetic solution when retention isn't a concern; recommended for mild to severe hearing losses. Available in acrylic, silicone and soft silicone.

Benefits of custom products

Cosmetics

Low profile in the ear

Personalization

Called custom for a reason

Localization

Utilization of pinna benefits

*Better Identification of where and how far sound is coming from

Natural sound quality

Location of the receiver relative to the eardrum

*Closer to eardrum provides a more natural experience

Wind management

Pinna allows for reduction wind noise

*Natural wind deflection

Dexterity

Ease of insertion/removal

Increased max stable gain

Deep insertion* with CIC and IICs result in increase maximum stable gain

*product extends beyond 2nd bend of ear canal

Cutting edge technology

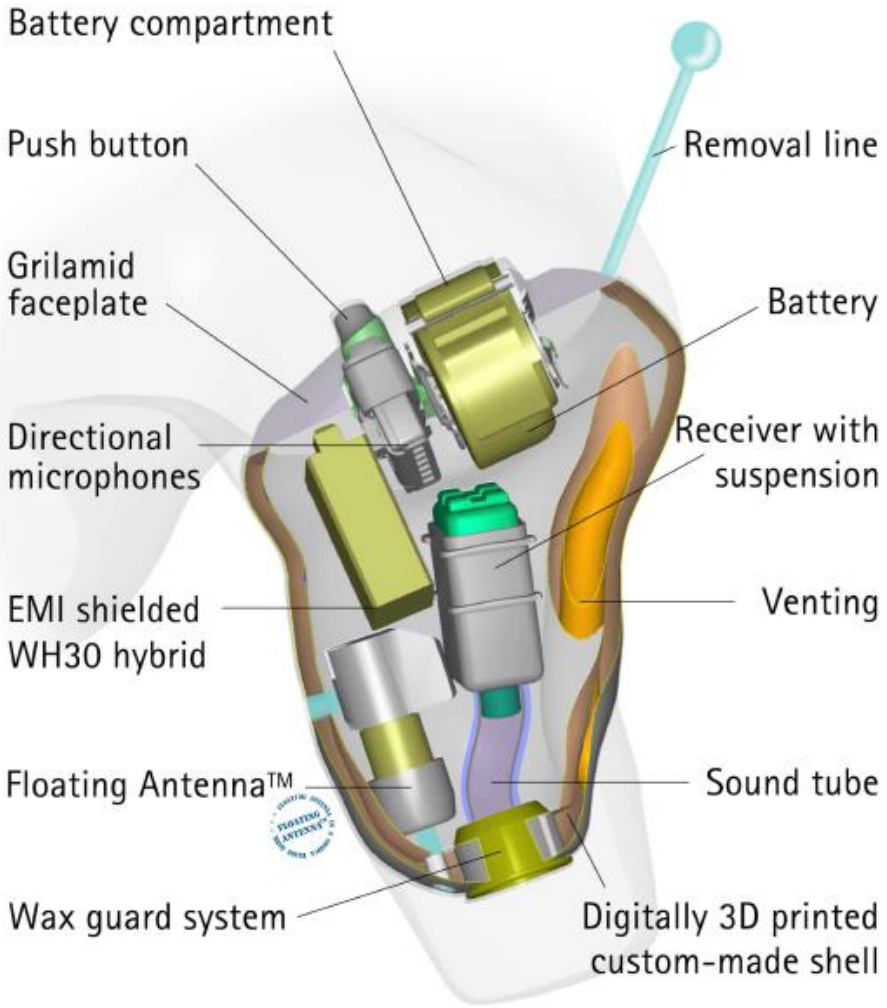
RSM technology from Sonova’s leading custom lab

Differentiate

Another way our customers can combat OTC disruption

Innovations in Component Design

CIC Components – The Inside Story



How are Custom Products Made?

Shell Fabrication Evolution

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Early 1990's

Monomer & Polymer Casting

Late 1990's

Ultra Violet Casting

2000

NemoTech - Laser Sintering

2004

Digital Light Printing

3D Printing

Future

Wax Printing

Titanium Shell Technology

State-of-the-art Manufacturing

Complete digital manufacturing process:

- High resolution impression scannin
- 3-D modeling
- Digital shell printing of custom pro ts

3D Scanning

3D Modeling

3D Printing

Finished Product

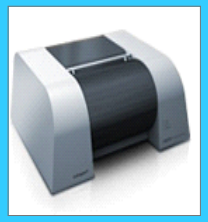
Custom Hearing Instruments State of the art manufacturing

What does that mean for you and your customers?

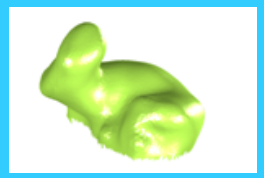
- Improved Quality – higher “first-fit” rate
- Electronic storage of impression scan and product design
  - Remakes & adding canal lock
  - L & D claims
- Advanced features like IntelliVent
- Biocompatible materials that are hypoallergenic
- Improved Cosmetics – smallest by design

Innovations

Digital Earmold Manufacturing



- 100% Digital Manufacturing for all Earmolds
  - Including Silicone in 40 and 70 Shore (Industry First!)

Manufacturing Process Video

Cool Facts

Process time to manufacture 1 hearing instrument

- 90 minutes Machine Time (Batch Printing)
- 1 hour Labor Time

Most large manufacturers are 100% Digital printing for Earmolds & ITE's

- 3D Printing
  - Silicone (via Cast Process)
  - Acrylic
    - Earmolds
    - ITE's

3D modeling and printing benefits:

- Reprint of lost or broken shells/molds, one phone call or email away
- Ability to change models/styles without need for new impressions
- Side by side analysis of old impressions with new impressions for better fitting products
- Venting algorithms based on audiogram takes guesswork out of vent selection

Modification and Tips Workshop
“Tackling Real World Challenges”

”

Have you ever accidently ripped an impression?

Impression Repair

- Challenge
  - Silicone is difficult to glue together in its cured state
  - Even if it is able to be re-glued, the bond is weak

- Solution
  - Primer & Glue **demonstration**

Earmold Silicone Modification

- Challenges
  - Current bits, burrs, and stones don't do the job
  - Produces too much heat
  - Flying debris

- Best Practice Solution
  - Grinding Caps are easy
  - Provides a nice smooth finish
  - **Demonstration**

Grinding cap holder – used with grinding caps (at right) for trimming silicone; attaches to modification equipment (026-5570)

Grinding caps, 150 grain – cap slides onto grinding cap holder for minor trimming/modifying of silicone (021-1032)

Grinding caps, 80 grain – cap slides onto grinding cap holder for sizable trimming/modifying of silicone (021-1033)

Acrylic ITE & Earmold Modification

- Challenges
  - Current bits and burrs (Carbide Cutters)
    - Too much material taken off
    - Leaves a rough finish
    - Requires major buffing to restore finish

- Best Practice Solution
  - Scotch Brite Wheel
  - Provides a nice smooth finish
  - Can be refinished or left as is
  - **Demonstration**

Cracked Shell (Demonstration)

- Challenge
  - Patient comes in with the hearing instrument cracked and cannot be without it

- **Short term Repair**
  - Super Glue, Scotch Brite, Buffing Wheel (as needed)
- **Longer term Repair**
  - UV Resin
  - UV Gun
    - It is important to get the correct cure time from your manufacturer to ensure the resin is fully cured

- Although repairs can be done in the office, note the warranty rules to prevent from voiding the product if it is within the warranty period
- Most manufacturers will allow the patient to use the repaired instrument until a replacement can be made

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EZ Tricks

- If there is a need to buff any Hearing Instrument
  - Make sure to insert a battery
    - This provides the required “Grounding” to prevent static electricity damage to the delicate electrical components
    - Note that this will not guarantee ESD damage

- How can you check for a new battery?
  - Drop Test **Demonstration**
    - A brand new battery when dropped will **not bounce much**
    - A used battery will have **significant bounce**
      - Note that this **does not mean the battery is dead**, it only shows that the chemical reaction has converted the zinc to zinc oxide.

- Pull String Repair
  - Use Knot method (Demonstration)

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Questions and Answers