



# Built for Real-life. Built Enviro-Tough.™

The goal of any hearing instrument is to provide the best audibility and sound quality possible for the client, whatever the degree of their hearing loss. Fitting people with severe to profound loss presents a unique challenge that requires a different approach.

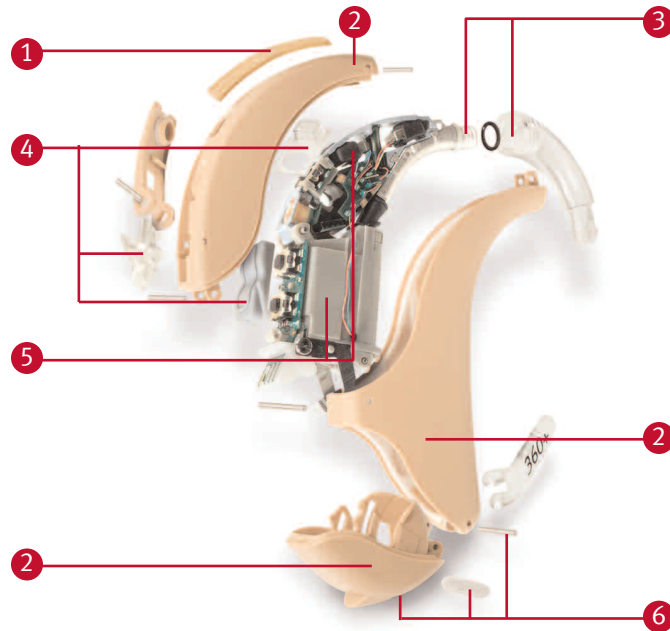
Along with high power amplification, people with severe to profound hearing loss need a reliable and durable product that stands up to the demands of everyday life. With a superior design and rigorous testing, 360™ is built to allow super power users to stay connected to the world around them and to the activities they enjoy.





## Superior shell design equals better durability

Static, intermittent performance and mechanical failures result from the contamination of internal components due to dust, debris and moisture. By developing the 360™ “L” shaped shell design and the following mechanical sealing component, Unitron Hearing has meticulously sealed 360 to minimize or eliminate these contaminants.



- 1 **Microphone protection** – microphone ports are typically an easy point of entry for contaminants, ports are protected by a proprietary material based on marine industry standards which is acoustically transparent, and tested for high humidity, perspiration and debris resistance.
- 2 **Plastic exterior components** – Enviro-Tough™ tested and engineered to fit seamlessly together with additional interior overlap, and soft rubber material internal gaskets, for superior protection.
- 3 **Threaded earhook and 2 O-rings** – work together to provide an excellent acoustic seal.
- 4 **Program toggle and volume control lever** – combination of soft rubber material and hard plastic (custom blend of Thermoplastic Elastomeric Olefin) effectively protects components against the environment even during periods of heavy use.
- 5 **Microphone and receiver** – embedded suspension offers consistent sound quality amid mechanical vibrations. Protective coating over all electronics shields from corrosion.
- 6 **Battery door** – inlet on battery compartment allows air to circulate while preventing dirt and humidity penetration. Titanium pin ensures long lasting durability.

## Proven Enviro-Tough™

Through rigorous laboratory testing, 360 was proven reliable and durable even after exposure to the most extreme conditions.



### Perspiration resistant

Exercising, boating or simply residing in humid climates are conditions which present opportunities for moisture to quickly degrade the performance of a hearing instrument. To measure resistance to high humidity, perspiration and dampness, 360 was tested in Cyclic Fog and Damp Heat Chambers. During a one hour Fog Chamber test, 360 was completely saturated with artificial perspiration, salt water and other acidic conditions. 360 was then placed in the Damp Heat chamber. The temperature inside the chamber was held at 40 degrees Celsius with 93% relative humidity for 15 hours. After completing five cycles between fog and damp, 360 was found to have no acoustic or mechanical degradation.

**Field trial participant quote:** *"I was concerned that while I was pulling out weeds and perspiring quite a bit that all that sweat might cause an issue with these hearing aids. But it didn't – they kept on working and I didn't need to stop and dry them out. I used to have to do that with my old ones."*

### Extreme temperature fluctuations

Temperature extremes such as leaving a warm house on a cold winter day, or placing hearing instruments in the car on a very cold or hot day, can significantly impact their performance. To evaluate how 360 would respond under such conditions, a Temperature Change Test was conducted. This test cycles between extremely low (-20 degrees Celsius) and extremely high (60 degrees Celsius) temperatures at a rate of 5 degrees per minute. Temperatures at the extreme ends of the cycle are then held for 1.5 hours. The units were monitored throughout testing to detect any acoustic compromise. After 10 cycles of hot and cold, 360 had no acoustic intermittence, no failure nor any mechanical deformation.

**Field trial participant quote:** *"I work in the service industry and I was in and out of a walk-in freezer for a couple hours taking inventory with my 360 aids on and they kept working without any issues."*

## Dust and debris protection

To test how 360 stands up to the intrusion of dust and debris, Unitron Hearing went to the Underwriters Laboratories for an Ingress Protection (IP) rating. IP testing standards indicate that the amount of talcum powder to be circulated is 2 kg per cubic metre of the test chamber volume. After being mounted in a chamber with talcum powder evenly dispersed throughout, 360 earned a rating of IP5x. This rating indicates that even with prolonged circulation exposure, 360 did not have any dust penetrate the shell. To equate this to real-life 360 would be able to withstand conditions such as playing in a sandbox, working at a construction site or in a dusty warehouse.



**Field trial participant quote:** *"I played beach volleyball with my 360 aids on without any issues."*

### Wear and tear

Most hearing aid wearers keep their hearing instruments for a period of 5 years and require the components to work all day, every day. Unfortunately, repeated use will yield intermittent or broken volume controls, loose battery doors, and worn earhook threads over time.

To test the durability of 360, Unitron Hearing performed stringent mechanical component testing on these very features. Test protocols were based on typical and extreme use that a hearing instrument wearer would perform each day for over a 5 year period.

- Battery door: Open and closed 7,300 times (approximately 4 times/day for 5 years). Confirmation that the battery door latch stayed securely closed and would not wear out or accidentally open when a user performed such actions as brushing their hair behind their ear.
- Volume control lever and push button: Individually pressed 80,000 times (approximately 43 presses/day over 5 years). Confirmation that after 80,000 presses the volume control and push button did not require any repairs.
- Earhook thread: Twisted for 2,000 cycles (approximately 5 twists/day annually for 5 years). Confirmation that the earhook threads did not wear and the earhook remained securely attached for an optimal acoustic seal.

## Impact resistant

Acoustic stability is extremely important in designing a BTE. Maintaining that stability through bumps and drops is critical to providing consistent sound quality for the client and product confidence to the fitter. To gauge the effects from accidental drops that may occur, Unitron Hearing performed multiple impact tests and measured the hearing instrument for acoustic performance.

In the first test, three hearing instruments were dropped on a weighted slider and then visually inspected and acoustically tested. The second test simulated a real-life, high impact, free-fall condition. Three 360 BTEs were dropped two times each on a hard tile floor from 0.5 meters, 1 meter, and 2 meters (approximately 6.5 ft high), with a 675 battery inserted for a realistic weight. After multiple drops, a visual inspection of 360 showed no damage to the outer shell. An electroacoustic test showed no additional current drain, intermittence, or component failures. Variance for any of these factors could result in a degradation of performance. Even after the impact tests, 360 performed without compromise.

## Conclusion

If a super power hearing instrument fails to perform or needs to be sent off for repair, the wearer can lose their connection to the world around them. 360 was designed Enviro-Tough for unbeatable durability and reliability, to meet even the most demanding needs of severe to profound users of all ages. Through rigorous laboratory testing, 360 continued to perform even after exposure to significant levels of moisture, dust and debris, as well as extreme temperature variations. Testing also proved that 360 was durable enough to endure long-term repeat use of user controls and impact on hard surfaces. 360 was proven to be the product to stand up to the demands of real-life.

**Author:** Tina Howard-Palmer, AuD



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Offices in:  
High Point, Greensboro, and Asheboro, NC  
<http://www.thehearingclinic.com/>  
[info@thehearingclinic.com](mailto:info@thehearingclinic.com)

**1-800-651-8551**

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3. Built for Real-life. Built Enviro-Tough™

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