FLEX Electrode Arrays
Right Fit for Each Cochlea
Above all else, the purpose of a cochlear implant is to create the best possible interface between the electrode array and the delicate neural structures of cochlea. All of the incredible technology in our cochlear implants flows across this intricate bridge between technology and nature.

How do we provide the most natural hearing possible with a cochlear implant? By engineering our electrode arrays to most closely match the precise natural design and function of the cochlea.

Our incredibly flexible electrode arrays help better protect the delicate structures in the cochlea, enabling atraumatic insertion all the way to the apical region. This allows our full-length electrode arrays to provide up to two turns of Complete Cochlear Coverage, which maximizes the natural tonotopic stimulation range. Finally, our unique variable-rate FineHearing sound coding is the only sound coding that mimics both tonotopic stimulation and temporal phase-locking in natural hearing for a sound quality that no other cochlear implant can match.1–13

But one size does not fit all—which is why we have individualized electrode arrays to best fit each unique cochlea. By enabling the closest possible match between electrode array and each individual cochlea, we’re taking our cochlear implants closer to natural hearing than ever before.14,15

Our incredibly flexible electrode arrays help preserve the delicate structures in the cochlea, enabling atraumatic scala tympani insertion all the way to the apical region.1–7

With our comprehensive electrode portfolio, you can easily choose the ideal array to match each individual cochlea.14,16

Only MED-EL offers electrode arrays long enough to cover up to two turns of the cochlea for better hearing performance and more natural sound quality.14–19

Only MED-EL provides a combination of both types of sound coding for the closest to natural sound perception.8–13
Complete Cochlear Coverage

In natural hearing, the nerve fibers of the spiral ganglion are tonotopically organized and extend the full length of the cochlea. If an electrode doesn't cover one and a half to two turns (540°-720°) of the cochlea, it can't stimulate these nerve fibers to provide accurate pitch-place match.15

Pre-curved or stiff straight electrodes can only cover half the cochlea (~360°). This leaves half of the cochlea unused and causes an unnatural sound quality that recipients describe as “robotic”, “tinny”, “echoey”, or “mechanical”. Adapting to this pitch-place mismatch can take years for even partial improvement.10

Our long, flexible arrays can be safely inserted to reach the apical region to provide natural tonotopic stimulation across up to two turns of the cochlea. With complete cochlear coverage, recipients can enjoy a natural pitch match from the very beginning. This enables significantly better hearing performance and a more natural hearing experience for your patients.8–11

* Angular Insertion Depth
* Tonotopic Pitch (Hz)

Only MED-EL offers electrode arrays long enough for up to 720° of angular insertion depth to cover up to two turns of the cochlea.
"This is a huge advantage that we can individualize the choice of these electrode lengths. We know there's a huge variation in sizes from cochlear lengths. The organ of Corti, the cochlear duct length varies from 25–36 millimeters, really this is a 50% change, from one patient to another patient."

Prof. Paul van de Heyning

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>0.16</td>
</tr>
<tr>
<td>30</td>
<td>0.14</td>
</tr>
<tr>
<td>25</td>
<td>0.12</td>
</tr>
<tr>
<td>20</td>
<td>0.10</td>
</tr>
<tr>
<td>15</td>
<td>0.08</td>
</tr>
<tr>
<td>10</td>
<td>0.06</td>
</tr>
<tr>
<td>5</td>
<td>0.04</td>
</tr>
<tr>
<td>0</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Individualized Electrode Arrays

When it comes to electrode arrays, one size doesn't fit all. In fact, there's a wider range of variation in cochlear duct lengths than shoe sizes. That's why we designed our FLEX Series arrays to provide the optimal length for the full range of cochlear anatomies.

With five FLEX arrays available in sizes between 20–31.5 mm, you can achieve complete cochlear coverage and full electrode insertion across a wide range of cochlear anatomies.

And with OTOPLAN*, the intuitive tablet-based surgical planning software, you can easily select the ideal electrode array based on the measurements of each individual cochlea.

* OTOPLAN is a product of CAScination AG.
Structure Preservation

Even in profound sensorineural hearing loss, the cochlea is full of living neural structures—a deaf ear is not a dead ear. These intricate natural structures are a fraction of the diameter of a human hair, making ultra-flexible electrode arrays necessary.

For more than 25 years, we’ve worked to create the most atraumatic cochlear implant electrode arrays possible. Our free-fitting arrays are uniquely engineered to deliver unparalleled flexibility, making them the most atraumatic cochlear implant electrode arrays available.21

Our incredibly flexible lateral wall arrays gently adapt to the shape of each individual cochlea to protect the delicate natural structures. Multiple recent studies have shown MED-EL arrays enable reliable scala tympani insertions. Our gentle arrays also optimally support hearing preservation, for combined electric-acoustic stimulation.

---

Our ultra-flexible free-fitting arrays offer superior structure preservation and reliable scala tympani placement.21

Atraumatic electrode placement in the scala tympani offers significantly better hearing outcomes for your patients.22

---

O’Connell et al. 2016

Electrode Arrays

FLEX Series
The softest and most flexible electrode arrays, designed for structure preservation and Complete Cochlear Coverage. Featuring 19 platinum electrode contacts and FLEX-tip technology for atraumatic insertion.

FLEX20
- 20 mm electrode array length
- 15.4 mm active stimulation range
- Diameter at basal end: 0.8 mm
- Dimensions at apical end: 0.5 x 0.3 mm

FORM Series
Designed specifically for malformed cochleae and for instances where leakage of cerebrospinal fluid (CSF) is expected. Featuring 24 platinum electrode contacts and SEAL technology designed to aid closing of the cochlear opening.

FORM24
- 24 mm electrode array length
- 18.7 mm active stimulation range
- Diameter at basal end: 0.8 mm
- Diameter at apical end: 0.5 mm

FLEX28
- 28 mm electrode array length
- 23.1 mm active stimulation range
- Diameter at basal end: 0.8 mm
- Dimensions at apical end: 0.5 x 0.3 mm

FLEX Series
- Dimensions at apical end: 0.5 x 0.3 mm

FLEX26
- 26 mm electrode array length
- 20.9 mm active stimulation range
- Diameter at basal end: 0.8 mm
- Dimensions at apical end: 0.5 x 0.3 mm

FLEX24
- 24 mm electrode array length
- 20.9 mm active stimulation range
- Diameter at basal end: 0.8 mm
- Dimensions at apical end: 0.5 x 0.3 mm

CLASSIC Series
Features 24 platinum electrode contacts.

STANDARD
- 31.5 mm electrode array length
- 26.4 mm active stimulation range
- Diameter at basal end: 1.3 mm
- Diameter at apical end: 0.5 mm

MEDIUM
- 24 mm electrode array length
- 20.9 mm active stimulation range
- Diameter at basal end: 0.8 mm
- Diameter at apical end: 0.5 mm

COMPRESSED
- 15 mm electrode array length
- 12.1 mm active stimulation range
- Diameter at basal end: 0.7 mm
- Diameter at apical end: 0.5 mm


Technical Data

FLEX Series
- Dimensions at apical end: 0.5 x 0.3 mm
- Diameter at basal end: 0.8 mm
- Dimensions at apical end: 0.5 x 0.3 mm
- 20.9 mm active stimulation range
- Diameter at basal end: 0.8 mm
- Dimensions at apical end: 0.5 x 0.3 mm

CLASSIC Series
- 24 mm electrode array length
- 20.9 mm active stimulation range
- Diameter at basal end: 0.8 mm
- Diameter at apical end: 0.5 mm

STANDARD
- 31.5 mm electrode array length
- 26.4 mm active stimulation range
- Diameter at basal end: 1.3 mm
- Diameter at apical end: 0.5 mm

MEDIUM
- 24 mm electrode array length
- 20.9 mm active stimulation range
- Diameter at basal end: 0.8 mm
- Diameter at apical end: 0.5 mm

COMPRESSED
- 15 mm electrode array length
- 12.1 mm active stimulation range
- Diameter at basal end: 0.7 mm
- Diameter at apical end: 0.5 mm