

Basic knowledge for tuning

Grasping the relative difference in the balance of low-range, mid-range and high-range sounds, humans perceive differences in sound. The low range is defined as sounds below 300Hz, the mid-range as 300Hz to 2kHz, and the high-range as above 2kHz. The range in which sound pressure drops the most on the Sound Frequency Characteristic Chart, from around 700Hz to around 1 kHz, is considered standard, and the sound image changes in accordance with differential between sounds below and above this range.

For example, let's consider what happens when Filter A is affixed to the sound pipe. (Please refer to the Filter A Frequency Response Graph on "About the Sound Character for Each Filter " chapter below.) With no filter, if 700Hz to 1kHz is considered standard, the differential in sound pressure in the higher range is greater than that of the lower range. For that reason, it feels as though sound is drawn toward the high-range. As we apply Filters A-1 thru A-5 in sequential order, attenuation of sound in the mid-range and the high-range increases. However, the impact on low-range sound is soft, and so the sound seems to be drawn toward the lower range.

As we move to Filter A-6 and beyond, the constraint on the mid-range becomes greater than that of the other ranges, placing emphasis on low-range and the high-range sound. When tuning, if drawing sound toward the low-range is desired, rather than changing only the low-range, please keep in mind that changing the high-range as well will change the relative feel of the sound, and adjust the overall balance with reference to the Sound Frequency Characteristic Chart and the Frequency Response Graph and the Sound Image Distribution Chart.

[About the Sound Impression Distribution Chart]

This is a chart that represents the relative impact on sound impression of each filter with the initial setting at the time of purchase as the default. The default setting is at the center of the 2 axes. With the horizontal axis representing sensation of high-range sound and the vertical axis represents sensation of low-range sound, the position on the chart indicates the level of change with regard to higher or lower level sensation.

* These values are based on the evaluation of an internal company tester, so please understand that they may differ to the evaluations by individual customers.

[About the Frequency Response Graph]

The frequency characteristic of earphones and headphones measures the sound pressure emanated when a 1mW (milli watt) audio signal is input into the earphone or headphone at each frequency. The vertical axis represents the level of sound pressure in decibels (dB), the larger the value the louder the sound. The horizontal axis represents the corresponding frequency of the sound in Hertz (Hz), the larger the value, the higher the frequency of the sound. This characteristic provides the fundamentals for the sound impression of earphones and headphones, and so it can be said to be the most important characteristic. Several other elements contribute to the determination of sound, so even sound with the same frequency characteristic can differ in accordance with various other factors.

* The 1 kHz value of this frequency characteristic is what is represented as "sensitivity" in earphone and headphone specifications.

** For speakers, a straight line (flat) is said to be proper graph, but a completely different way of thinking is necessary for earphones and headphones. For details please refer to the last chapter of "Acoustics lecture for knowing earphones / headphones" page. Please access there from the following bottom.

About the Sound Character for Each Filter -Difficulty Level★-

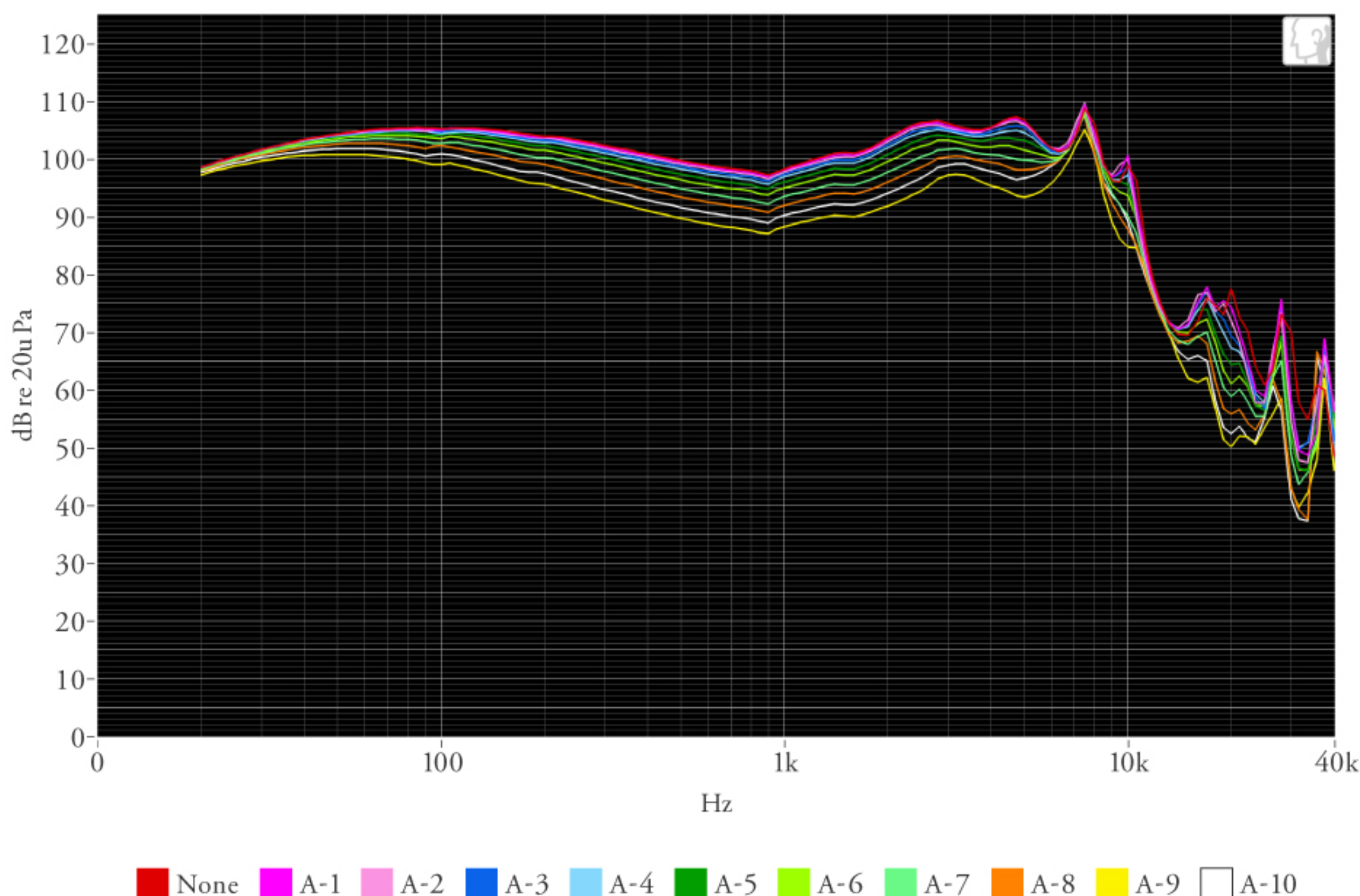
★ Filter A [Sound pipe]

Passing sound generated by the drive unit through filters mainly attenuates the mid-range and high-range sound.
Generally speaking, the thicker and higher precision, the greater the attenuation.

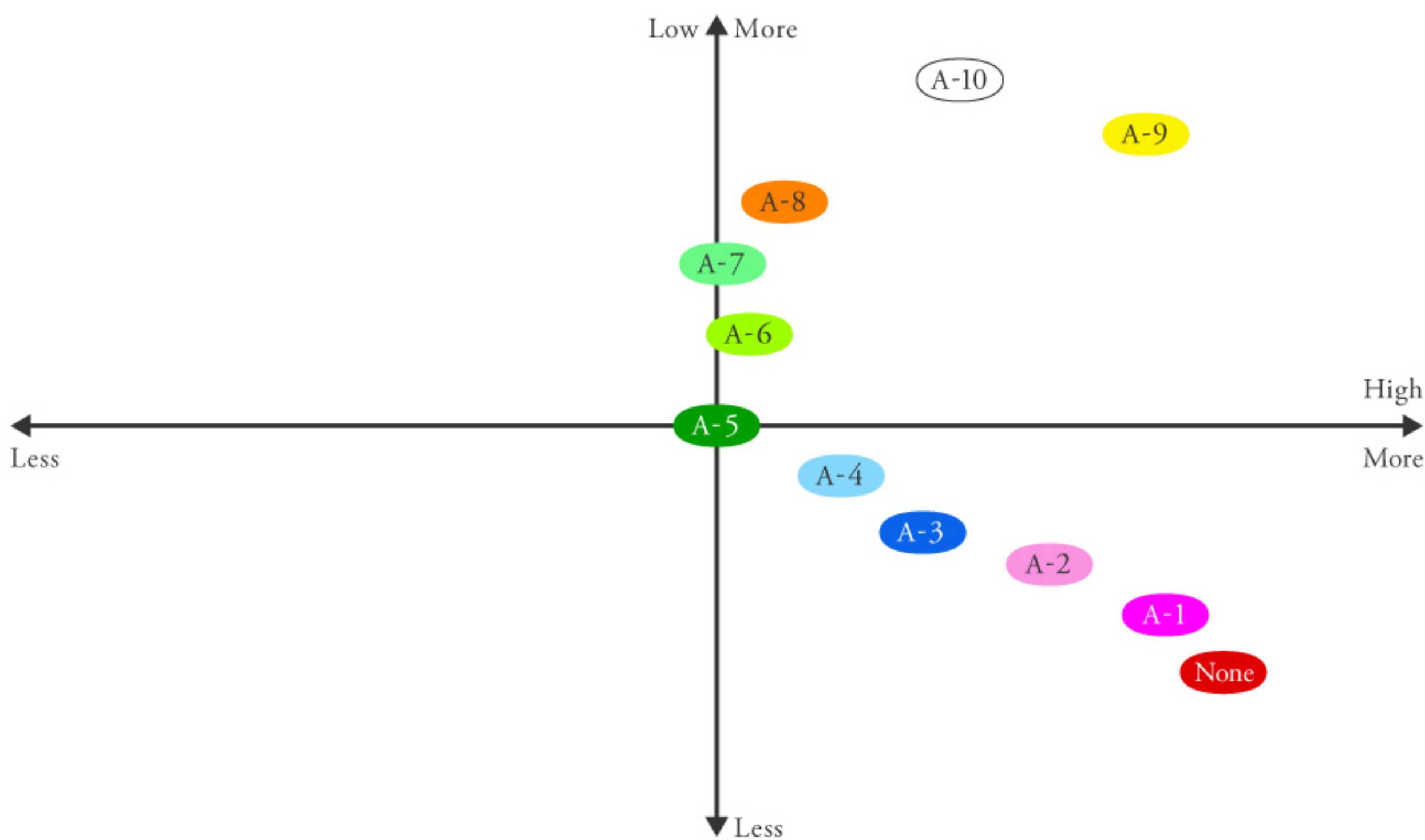
This is the location at which adjustments to sound are the greatest.

* With regard to Filters A-9 and A-10, the precision of Filter A-10 is the greatest, but in fact the greatest attenuation of mid-range and high-range is achieved using Filter A-9. This is due to several other factors.

— Filter A [Sound pipe] Frequency Response Graph —



— Filter A [Sound pipe] Sound Impression Distribution Chart —



★ Filter A [Driver holder vent]

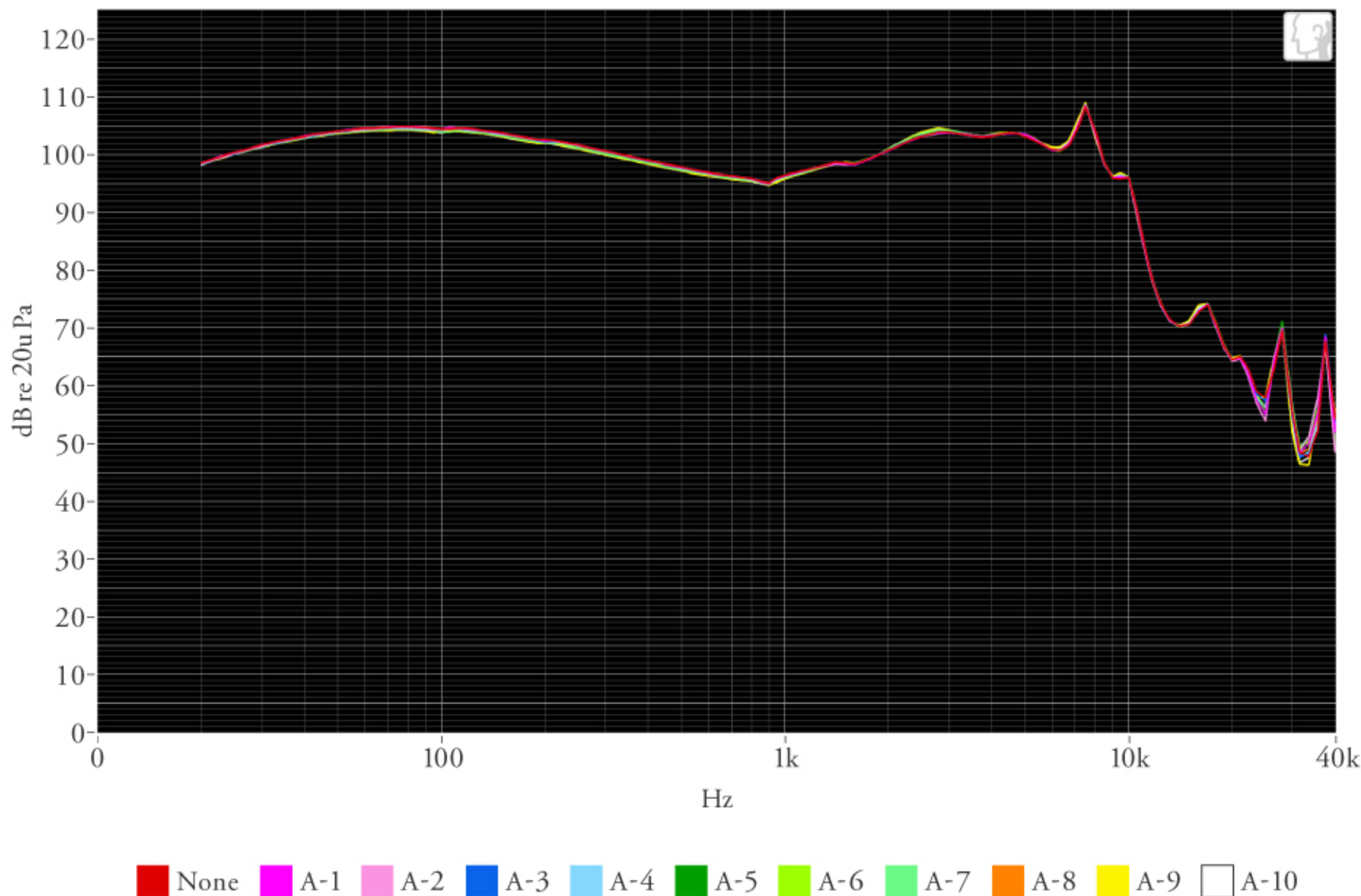
Applying a filter to the driver holder opening mainly reduces low-range sound vibration.

Generally speaking, the thicker and higher precision, the greater the reduction in low-range sound.

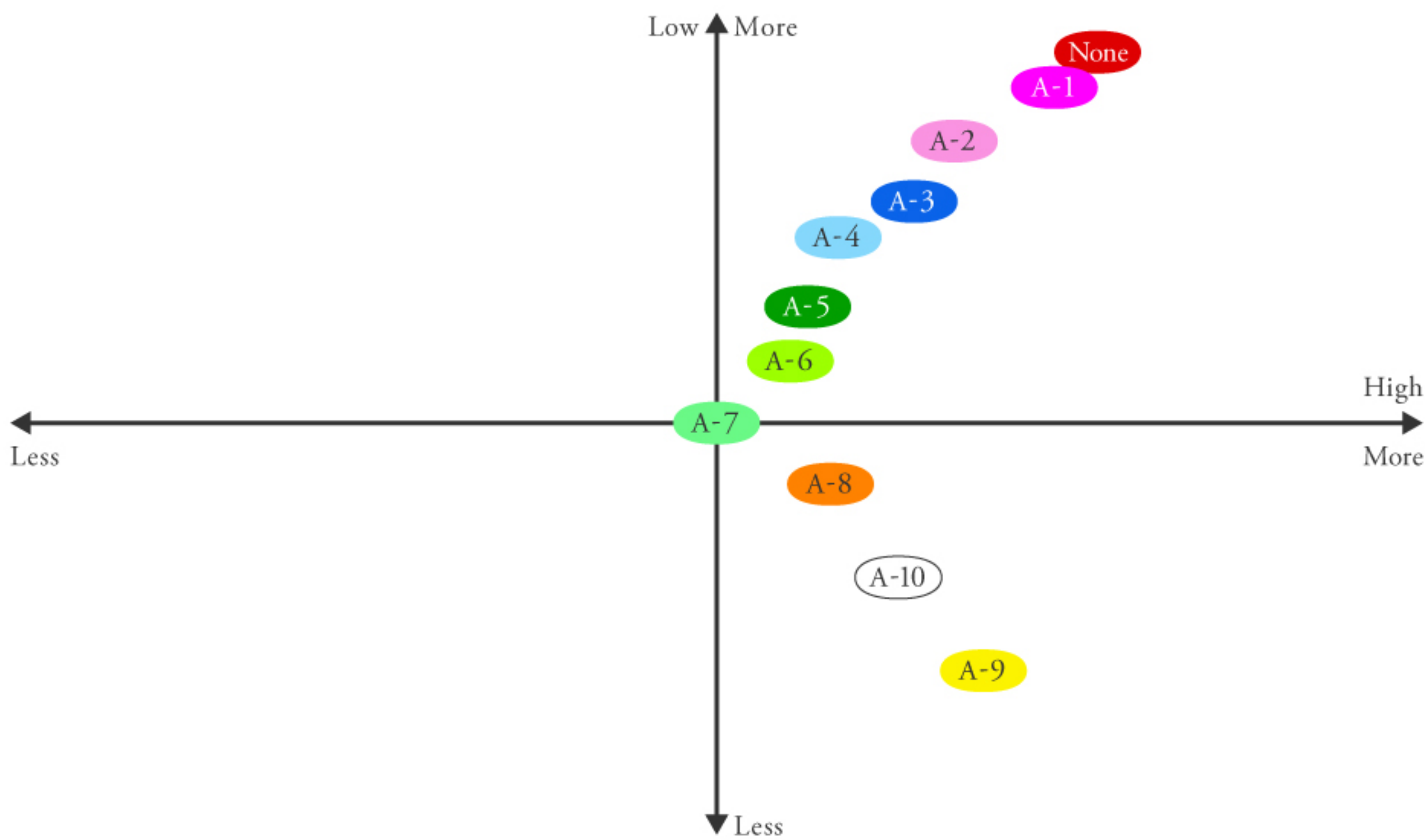
The change in sound pressure may appear small on the Frequency Characteristic Chart, but because of the wide range sound impact, the impact of the change will feel wider when listening.

* With regard to the precision of Filters A-9 and A-10, A-10 is higher precision but in fact greater attenuation of high-range sound is achieved with A-9 due to other factors.

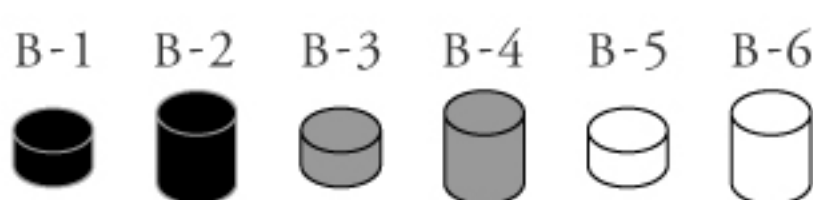
— Filter A [Driver holder vent] Frequency Response Graph —



— Filter A [Driver holder vent] Sound Impression Distribution Chart —



★ Filter B

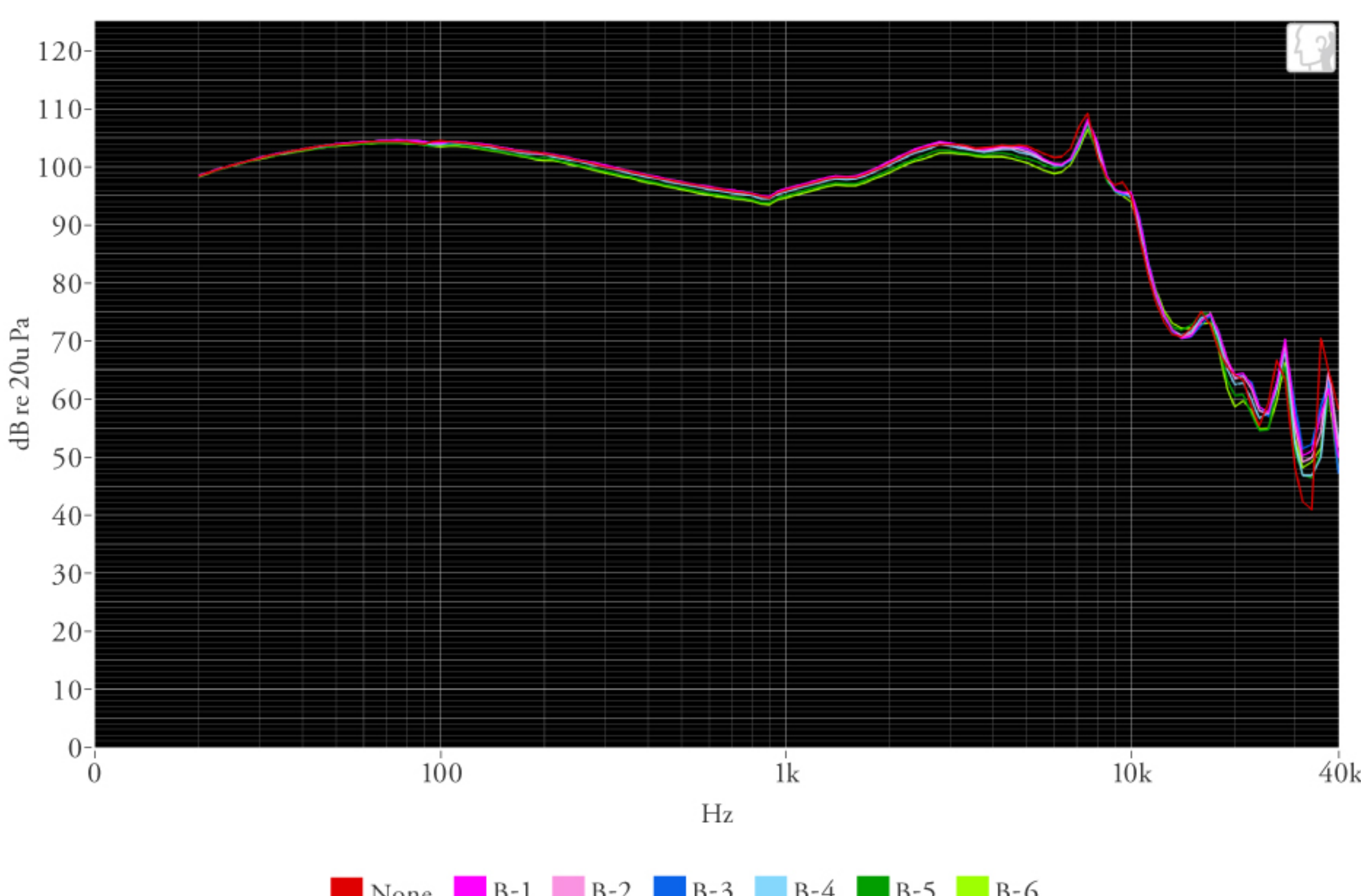


Passing the sound generated by the driver unit through filters mainly reduces the sound pressure of high-range sound.

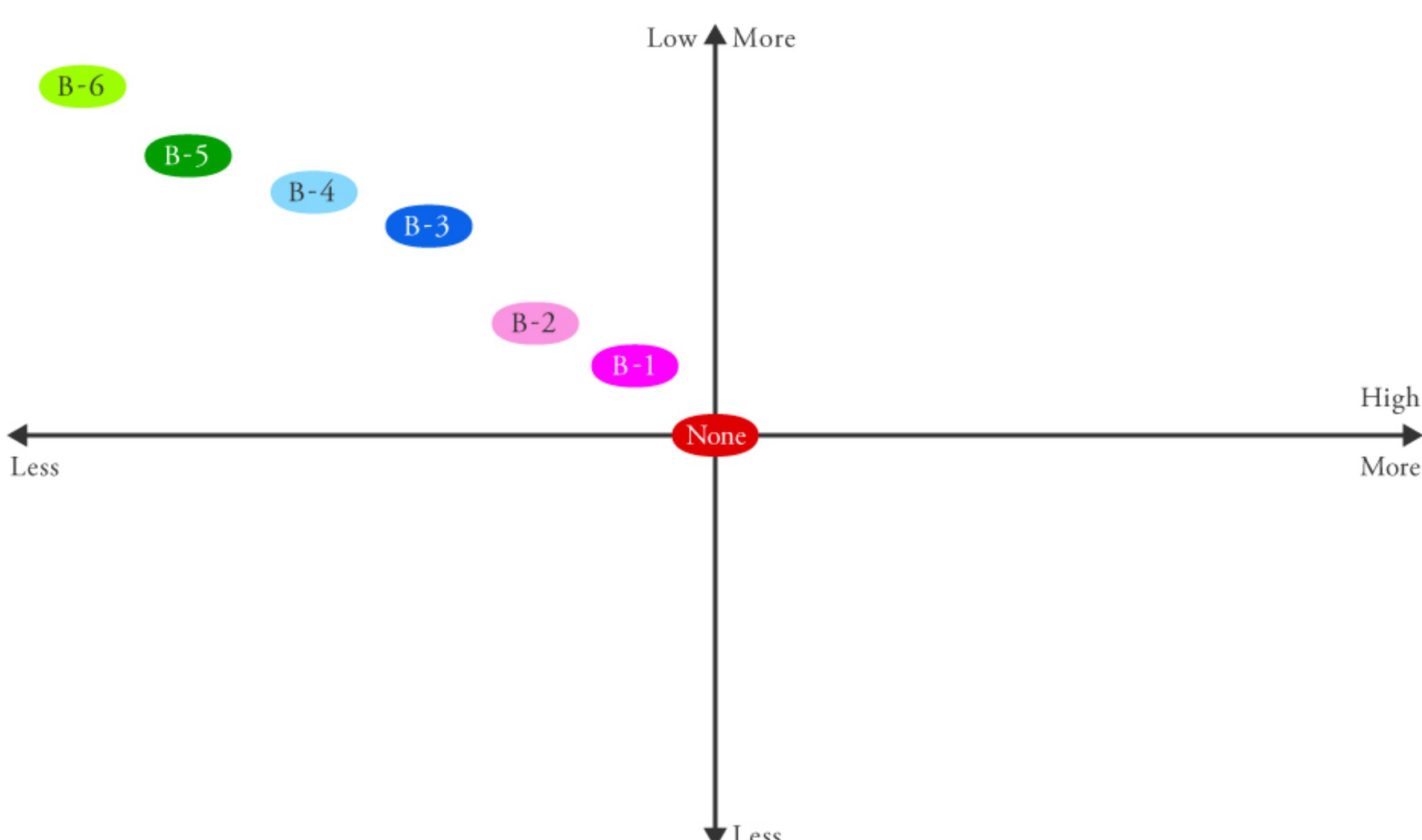
The higher precision and thicker the filter, the greater the impact.

The change in sound pressure may appear small on the Frequency Characteristic Chart, but because of the wide range sound impact, the impact of the change will feel wider when listening.

— Filter B Frequency Response Graph —



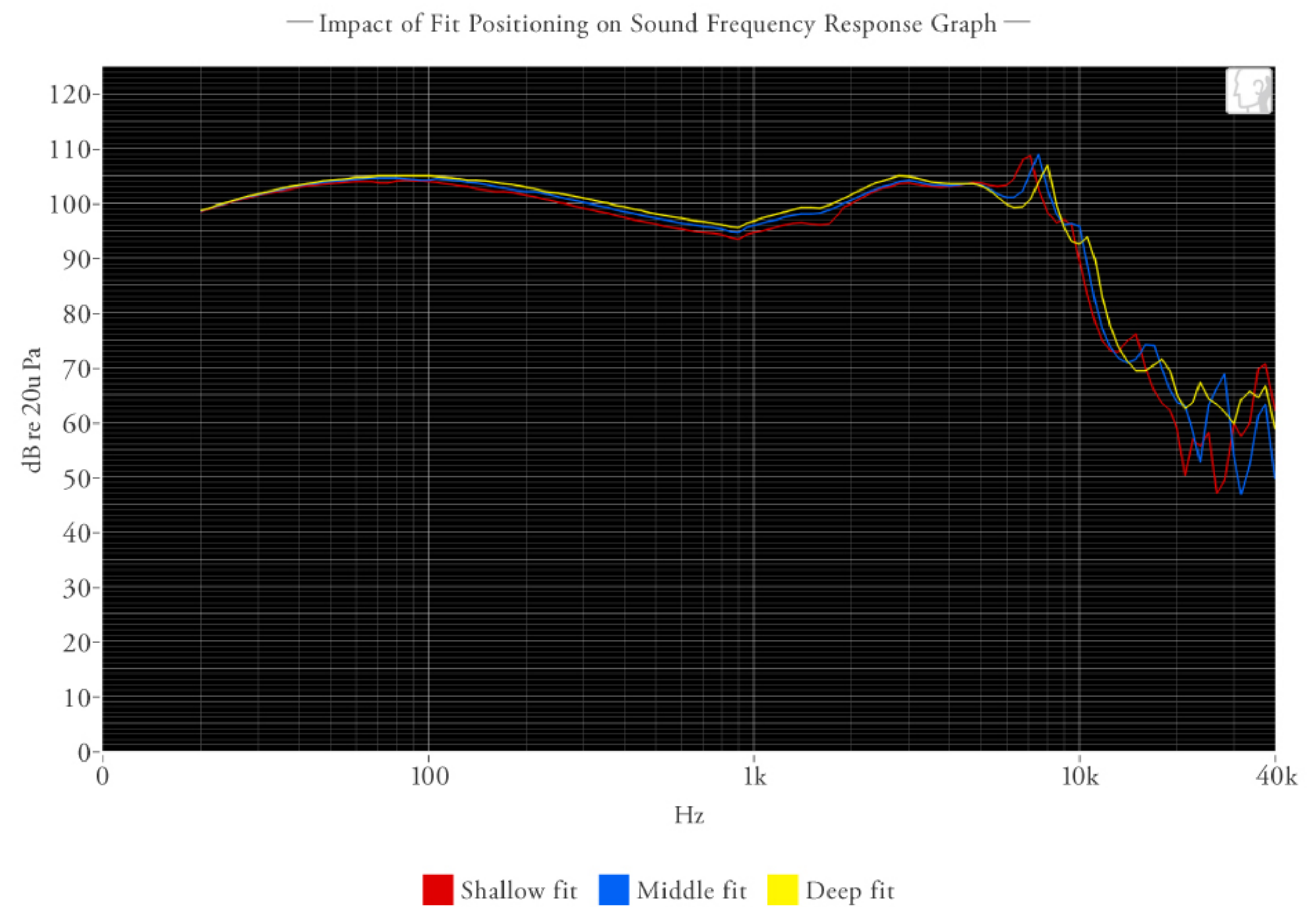
— Filter B Sound Impression Distribution Chart —



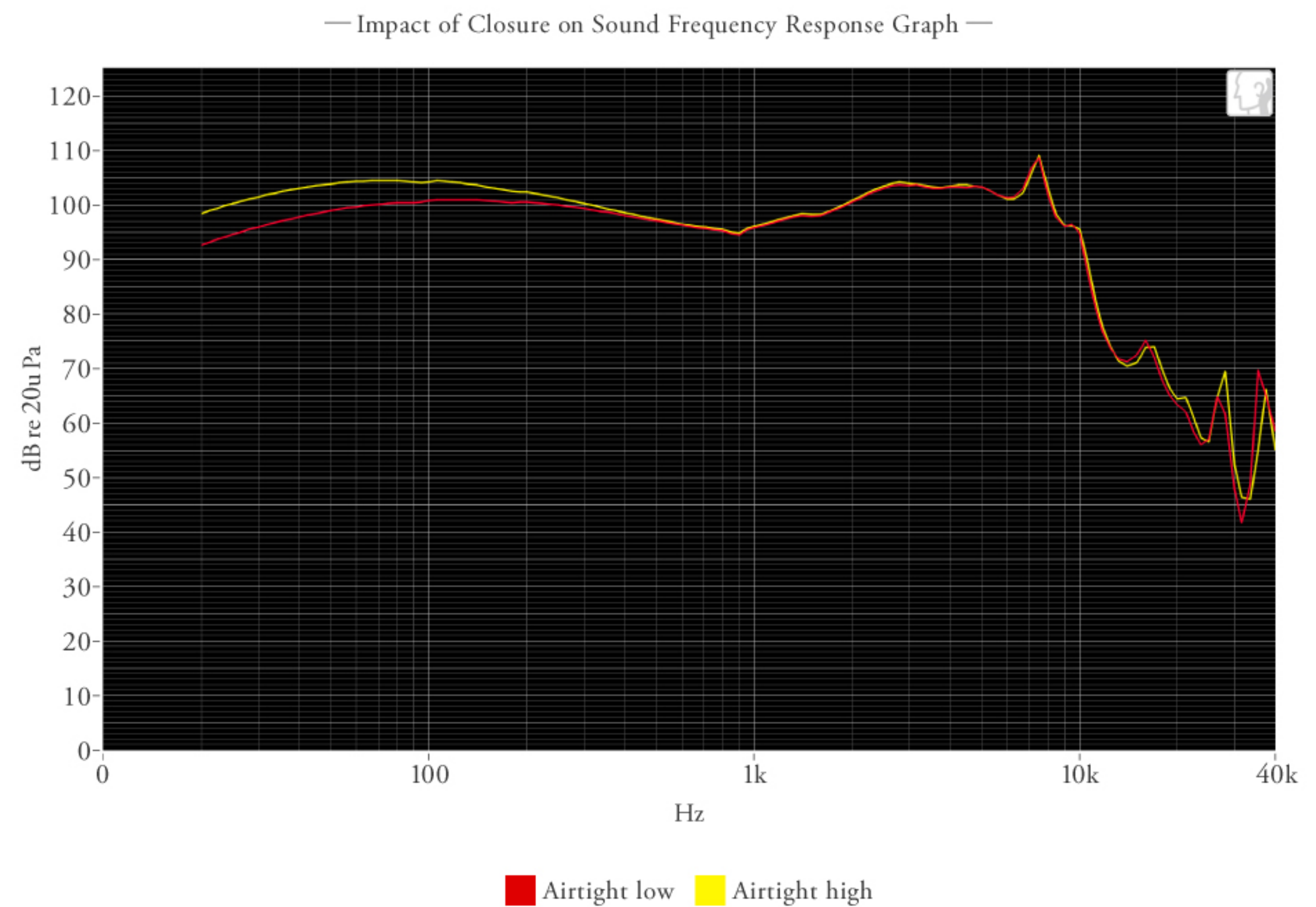
About the Earpiece Size and Location and Sound Character

-Difficulty Level★-

The position and fit of earphones affects the way in which sound is heard.
In cases of shallow fit in which the distance to the tympanic membrane is great,
sound is soft and shifted to the high-range.
On the contrary, a deep fit in which the distance to the tympanic membrane is small allows for clearer sound,
and because the peak of the high-range sound is shifted higher,
highly sensational sounds are ignored during listening, contributing to a more relaxed sound.



Additionally, closure of the ear canal between the earpiece and the external ear canal alters
the frequency characteristic of the lowest range sounds below 100kHz.
For this reason, not only the audibility of the low-range but also the audibility of high-range sound is altered greatly.
When the closure is small with a light fit, vibration of the lowest range sounds below 100kHz is attenuated,
and the sound seems to shift toward the higher range. On the contrary, in the case of a tight fit,
low range vibration is transmitted without reduction in vibration. In other words, through a sensation of closure,
a change in earpieces can have a tremendous impact on the sound impression.



Tuning Steps - Difficulty Level★ -

★ STEP 1

Listen to music using the default setting until you grasp an image of how specifically you would like to improve the sound. (For example, "I'd like more bass," or "I would like the high range to ring more clearly.")

★ STEP 2

Select filters and earpieces in reference to the [Frequency Response Graph] and [Sound Impression Distribution Chart] above.

★ STEP 3

Remove the earpiece from the housing.

-Before-



-After-



★ STEP 3-1 : Grasp the earpiece firmly between the index finger and thumb and pull gently with a slight twisting motion to remove it from the housing.



★ STEP 4

(Perform the following procedures on either the Left or Right side.
Once Step 7 has been completed, return to Step 4 and perform the same procedures on the other side.)

Open the housing

*The actual wire specifications are different from the one on the photos.
We changed the wire to the one with insulation coating which is more resistant to disconnection.

-Before-

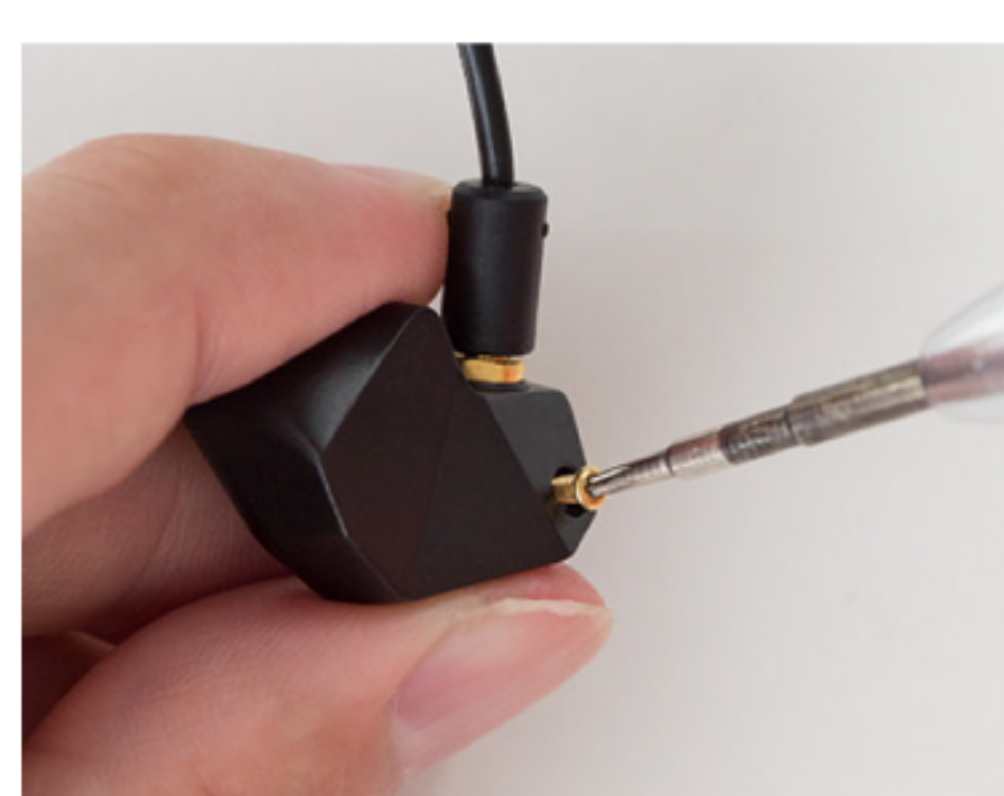


-After-



Snugly insert the tip of the driver into the head of the bolt on the front housing

★ STEP 4-1 : (side with no logo) so that the tip of the driver firmly contacts the indentations in the bolt head, then turn the driver counterclockwise to loosen the bolt.



⚠ Point

✓ Use 3 fingers to firmly support the housing.

⚠ Point of Caution

✓ Do not apply excessive force as there is a risk of stripping or breaking the bolt shaft.

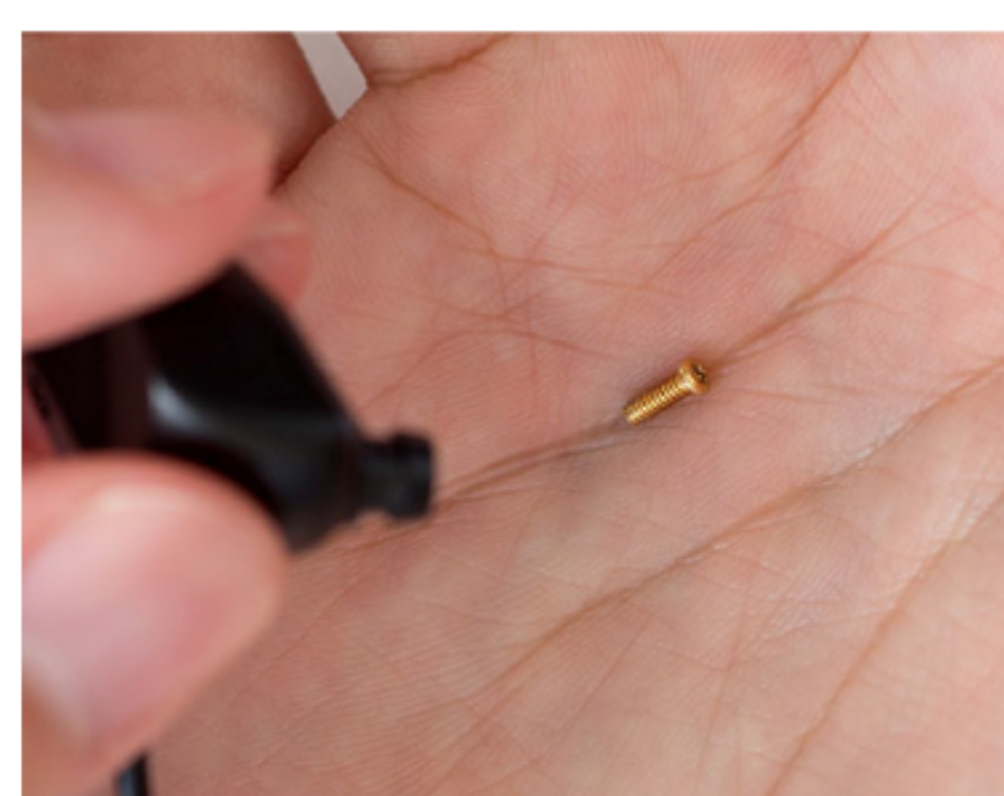
★ STEP 4-2 : When finished loosening the bolt, turn the housing around and tap out the loosened bolt.



⚠ Point of Caution

✓ Bolts are small and easy to lose, so please place them on a small plate or tray.

★ STEP 4-3 : Loosen and remove the bolt on the rear housing piece (the side with the logo) in the same manner.



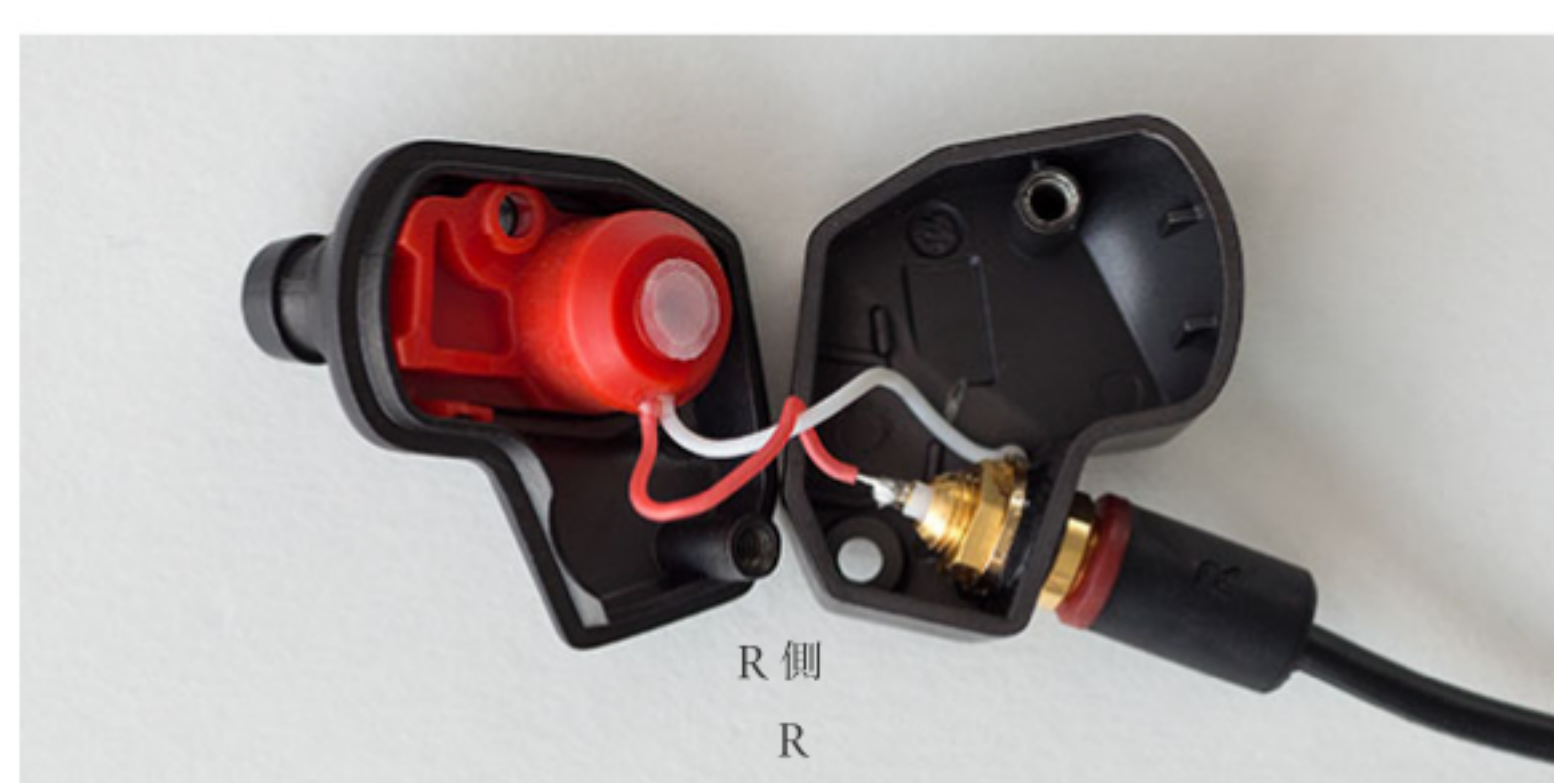
★ STEP 4-4 : Place the rear housing piece (the side with the logo) on top, hold on to the sound pipe and slowly open the housing.



⚠ Point

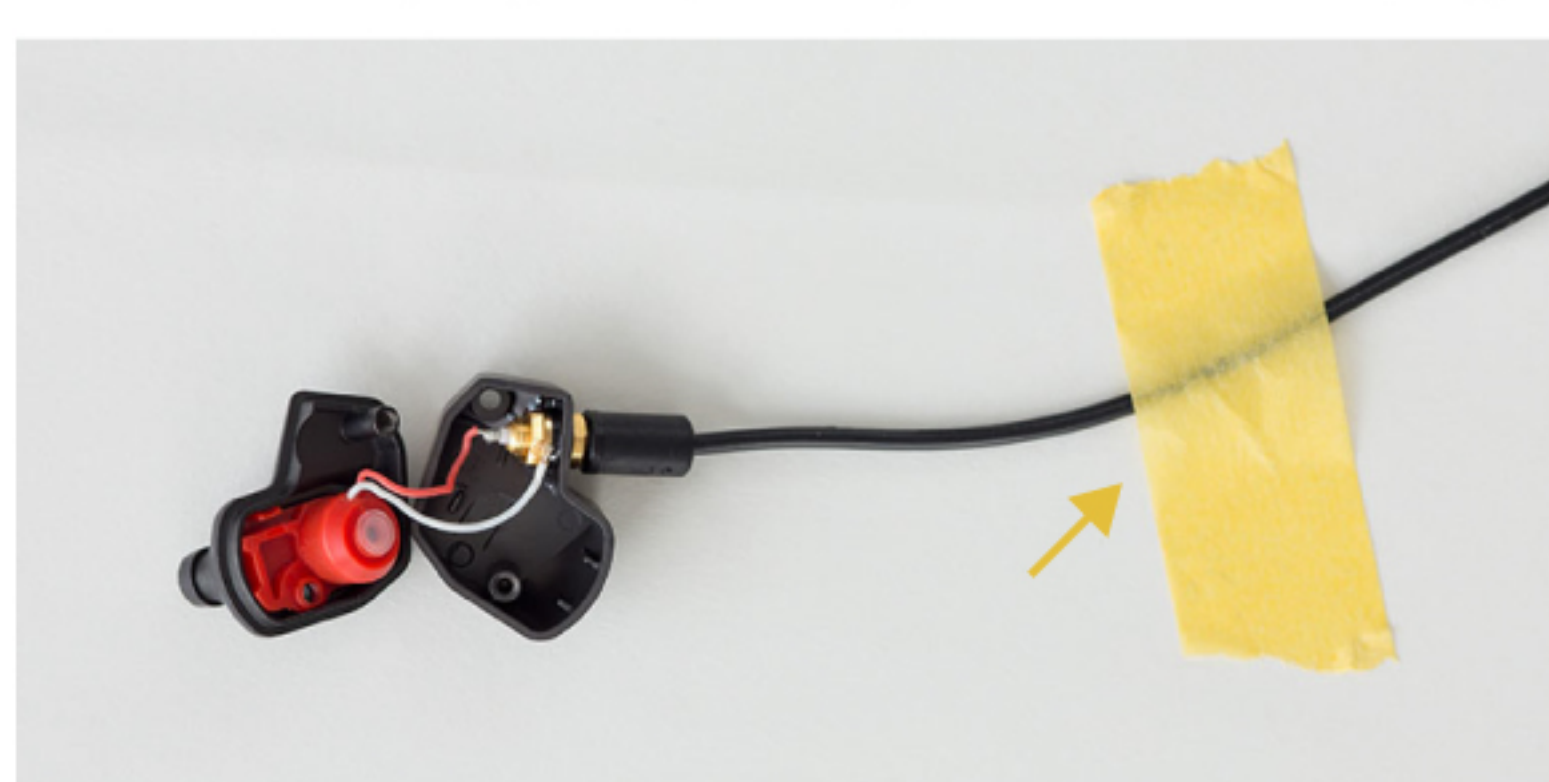
✓ If the rear housing piece (the side with the red driver holder) is placed opposite user's dominant hand as depicted in the photo, procedures in the next step will be easy to perform.

(Left-handed users should place the rear housing on the opposite side from that depicted in the photo.)



✓ Using masking tape to affix the cable to the table top at a position about 3cm away from the housing as depicted in the photo will make procedures in the next step easy to perform.

*Masking tape is not included in the package. For purchase, please contact the store you purchased the product.



⚠ Point of Caution

✓ The front and rear housing pieces are connected by electrical wires, so they cannot be completely separated. Do not try to forcibly separate them.

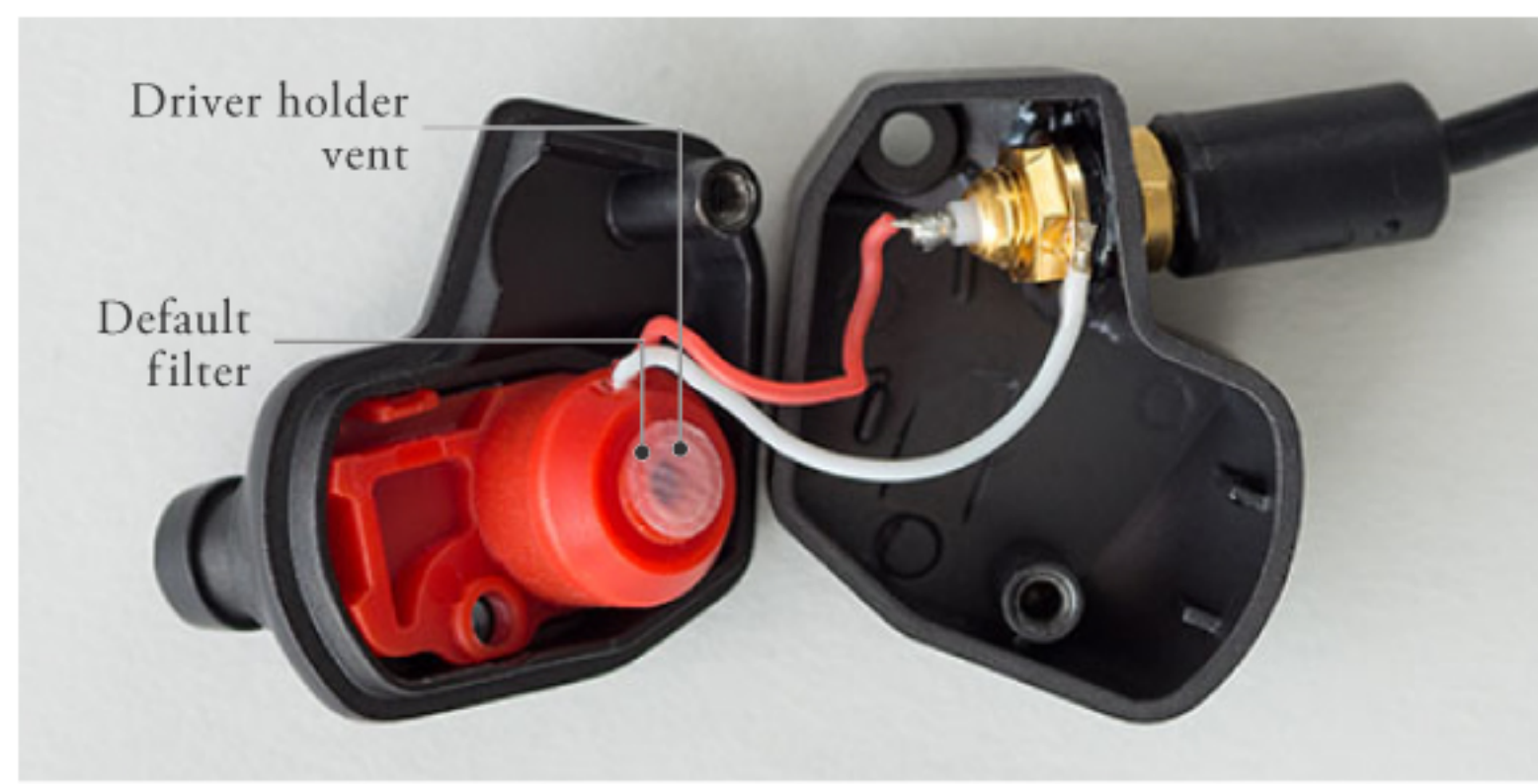
✓ Please open the housing slowly and gently. Please take care because carelessly forcing the housing open could sever the electrical wires inside.

✓ When opening the housing, take care not to twist the electrical wires inside. Placing strain on the electrical wires may cause them to sever. (Electrical wires may be slightly twisted at the time the product is shipped by the manufacturer. If this is the case, there is no cause for concern.)

★ STEP 5

Affix the filter on the driver holder vent for tuning.

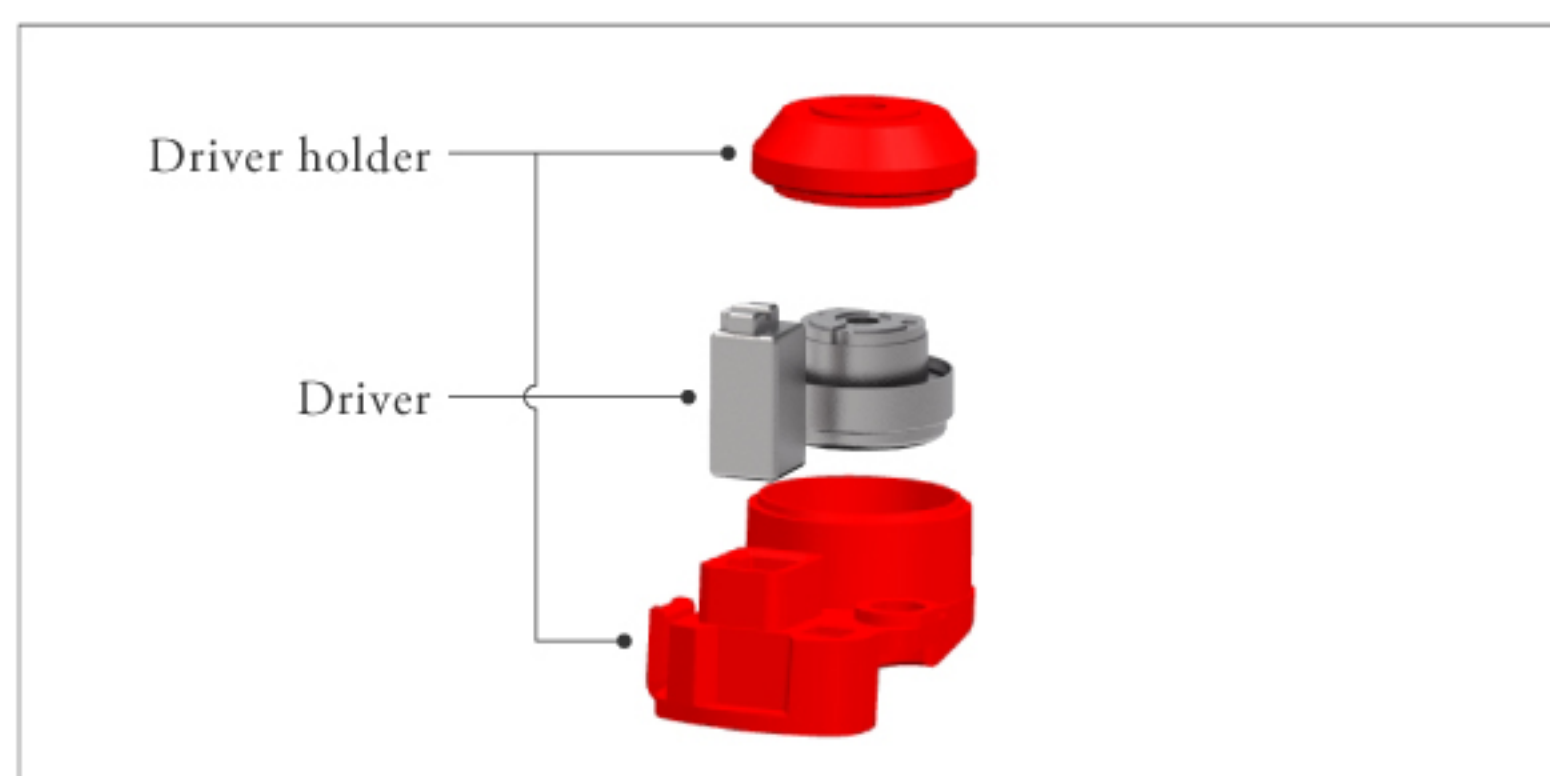
-Before-



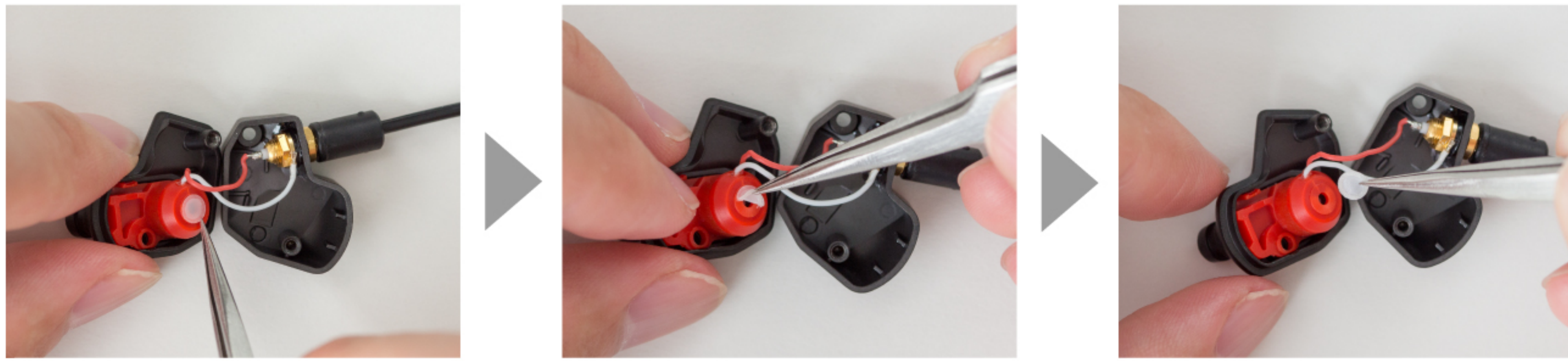
-After-



* There is a driver unit under the red driver holder. It is not possible to open this holder and remove the driver, so please do not try.



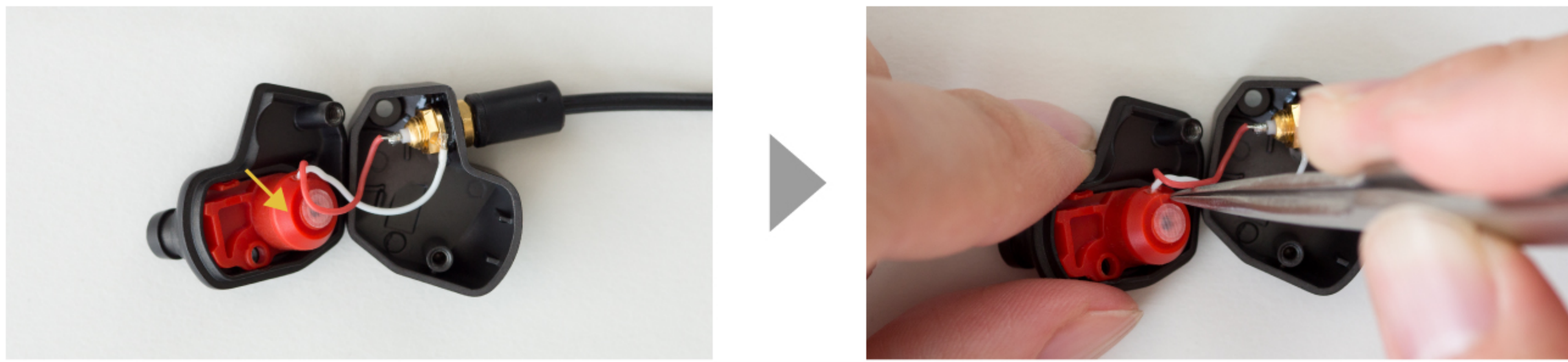
★ STEP 5-1 : Place the housing on a table using the thumb and index finger to hold it in place and peel off the filter affixed to the top of the red driver holder using tweezers.



⚠ コツ

✓ Do not try to remove the filter with one quick motion. Peel back the edge little by little to remove the filter cleanly.

✓ In the event that an electrical wire rides a top the driver holder, the procedure may be difficult to perform, so please use tweezers to gently move the electrical wire aside.



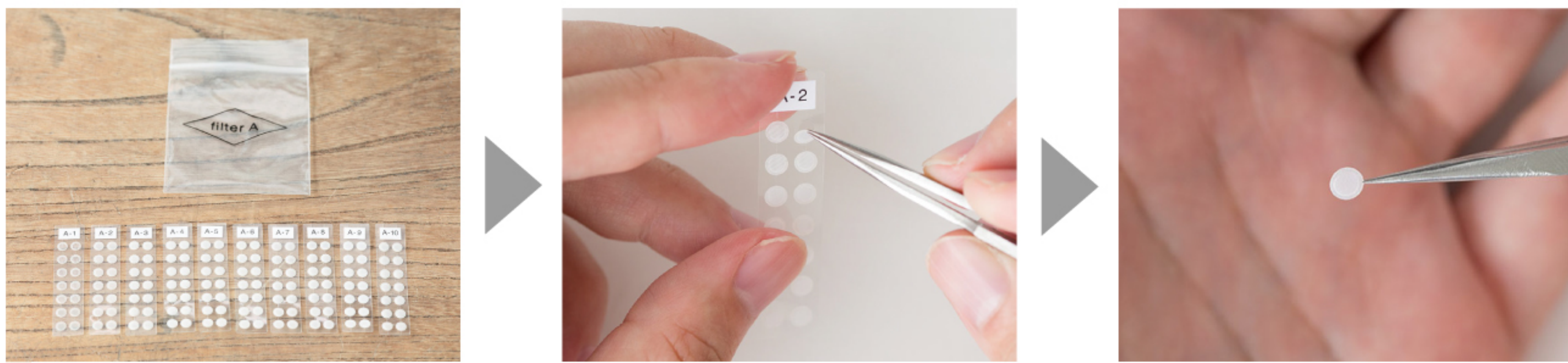
⚠ 注意点

✓ In some cases, only the adhesive portion of the filter may remain. Please cleanly remove the adhesive portion.

✓ Lifting the chassis and raising it above the table places strain on the electrical wires, so be sure to perform the procedure with the chassis placed firmly on the table, not raised above it.



★ STEP 5-2 : Select the desired filter from among the Filter A and peel it away using tweezers.

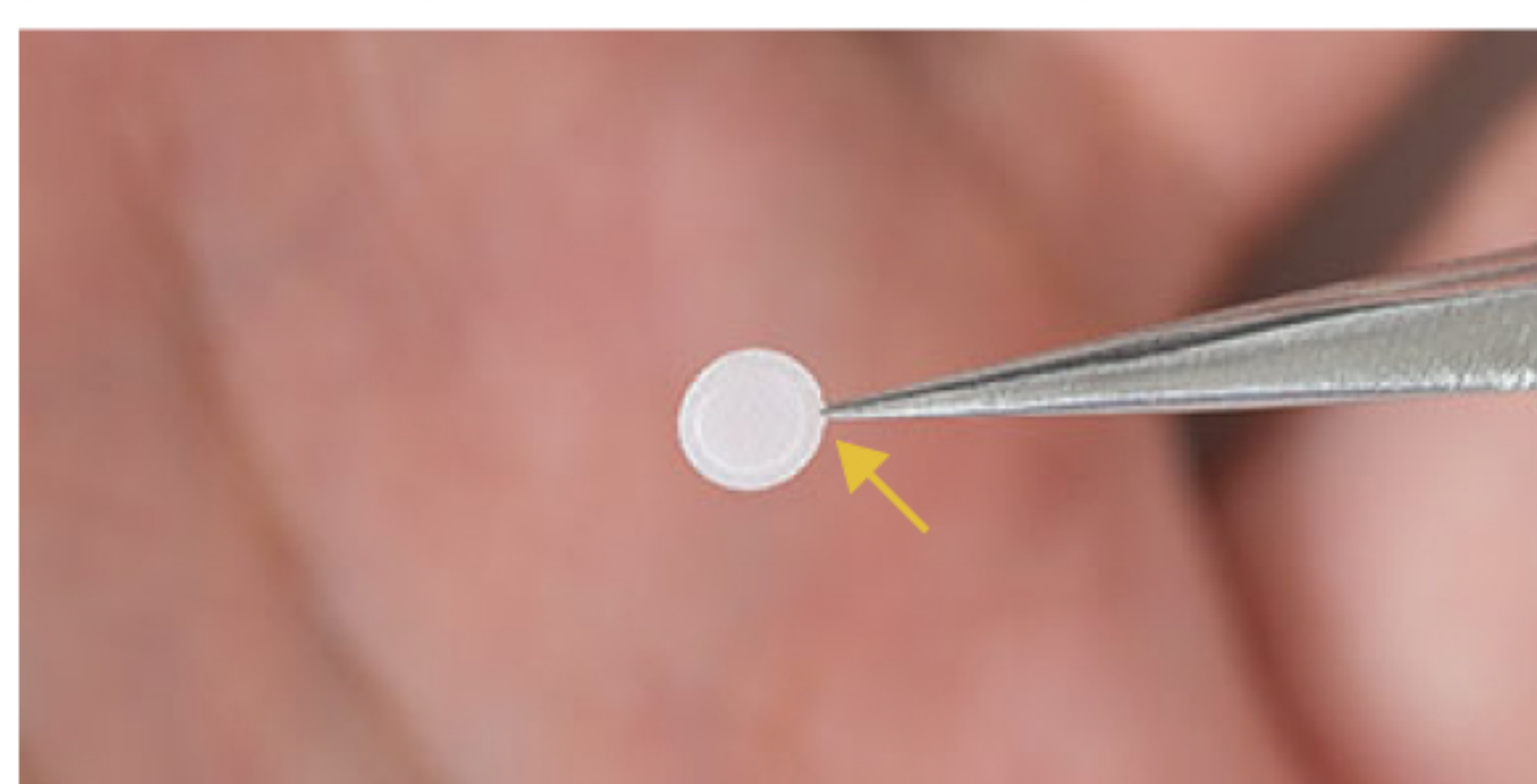


⚠ Point

✓ Reversing the sheet and popping out the filter makes it easy to peel away.



✓ Grasping the filter as far as possible toward the terminal edge will help it affix more smoothly.



⚠ Point of Caution

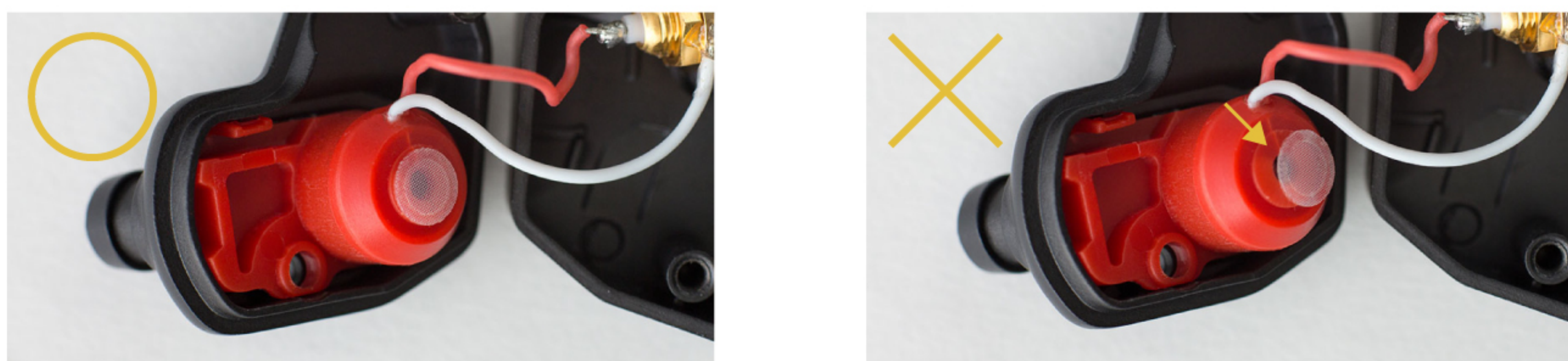
✓ Filters warp easily, so please refrain from pulling on them with excessive force.

★ STEP 5-3 : Affix the filter to the circular shaped portion near the driver holder vent.

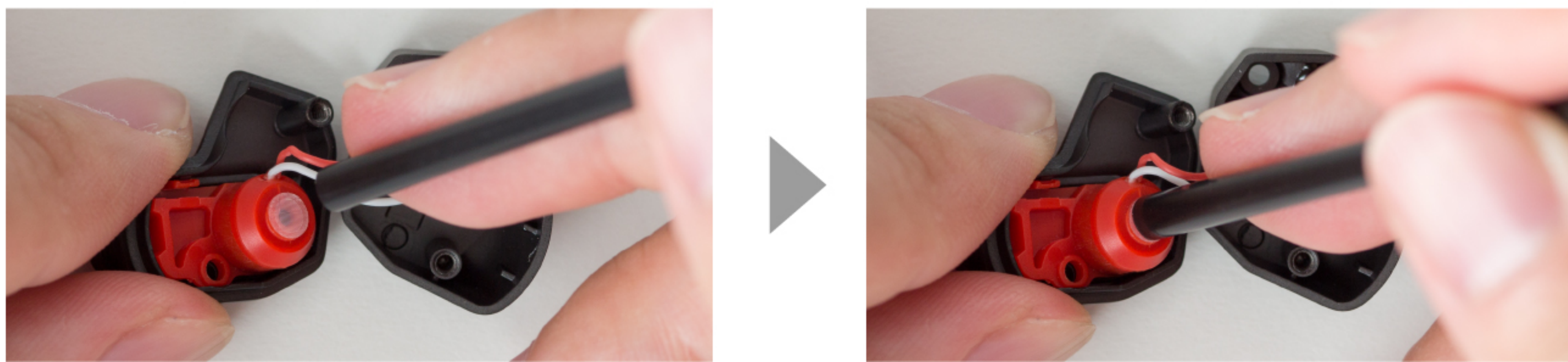


⚠ Point of Caution

✓ Please affix the filter in precise alignment to the edge. Take care because a misaligned filter or loose adhesive contact may cause air leakage to occur.



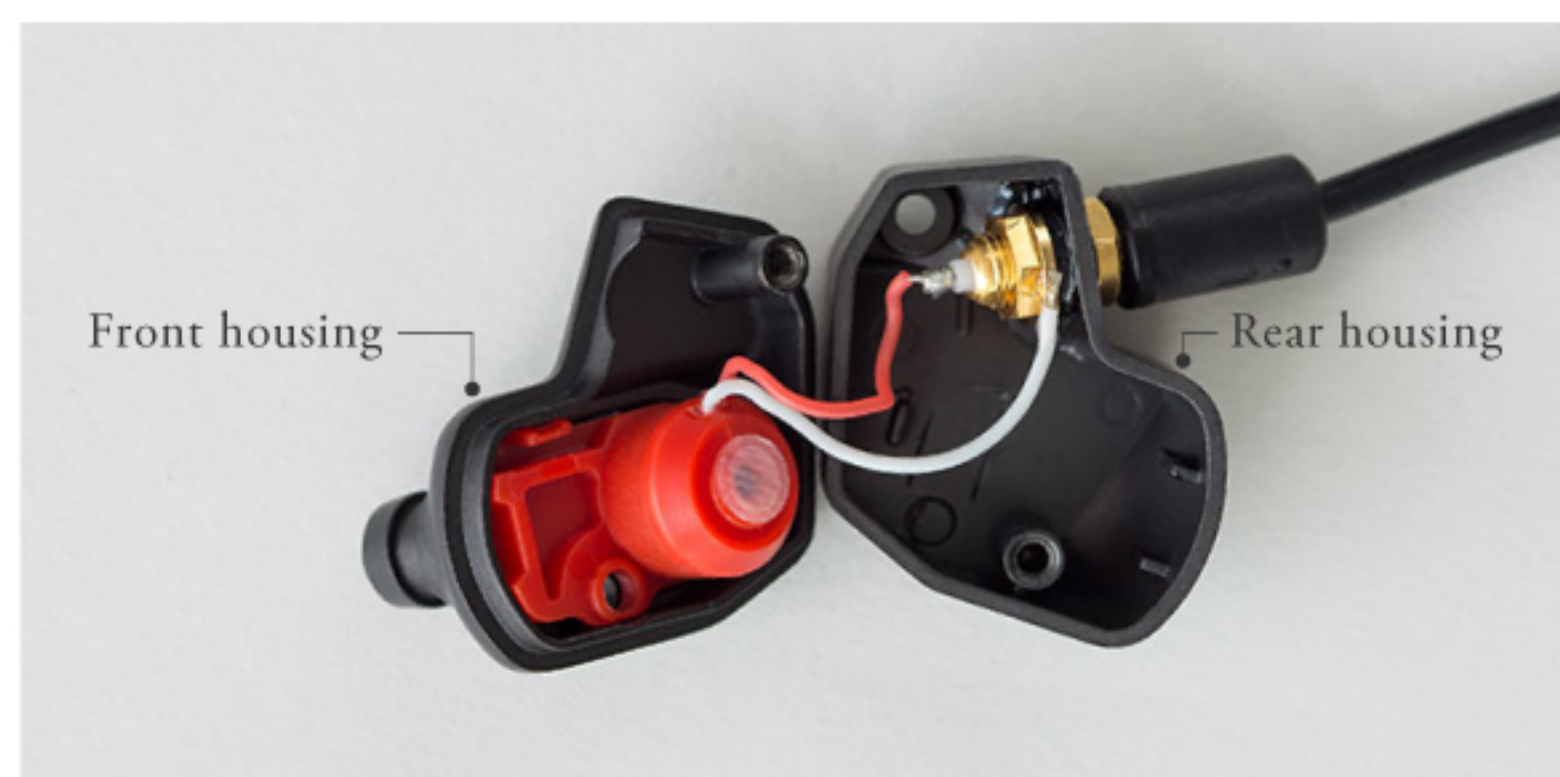
★ STEP 5-3 : Use the tip of the acoustic tool to gently press the adhesive portion of the filter into contact.



★ STEP 6

Close the housing and return to original condition.

-Before-



-After-



Grasp the sound pipe of the front housing piece (the one with the red holder)
★ STEP 6-1 : and slowly close the front and rear housing pieces together, taking care not to pinch the internal wiring.

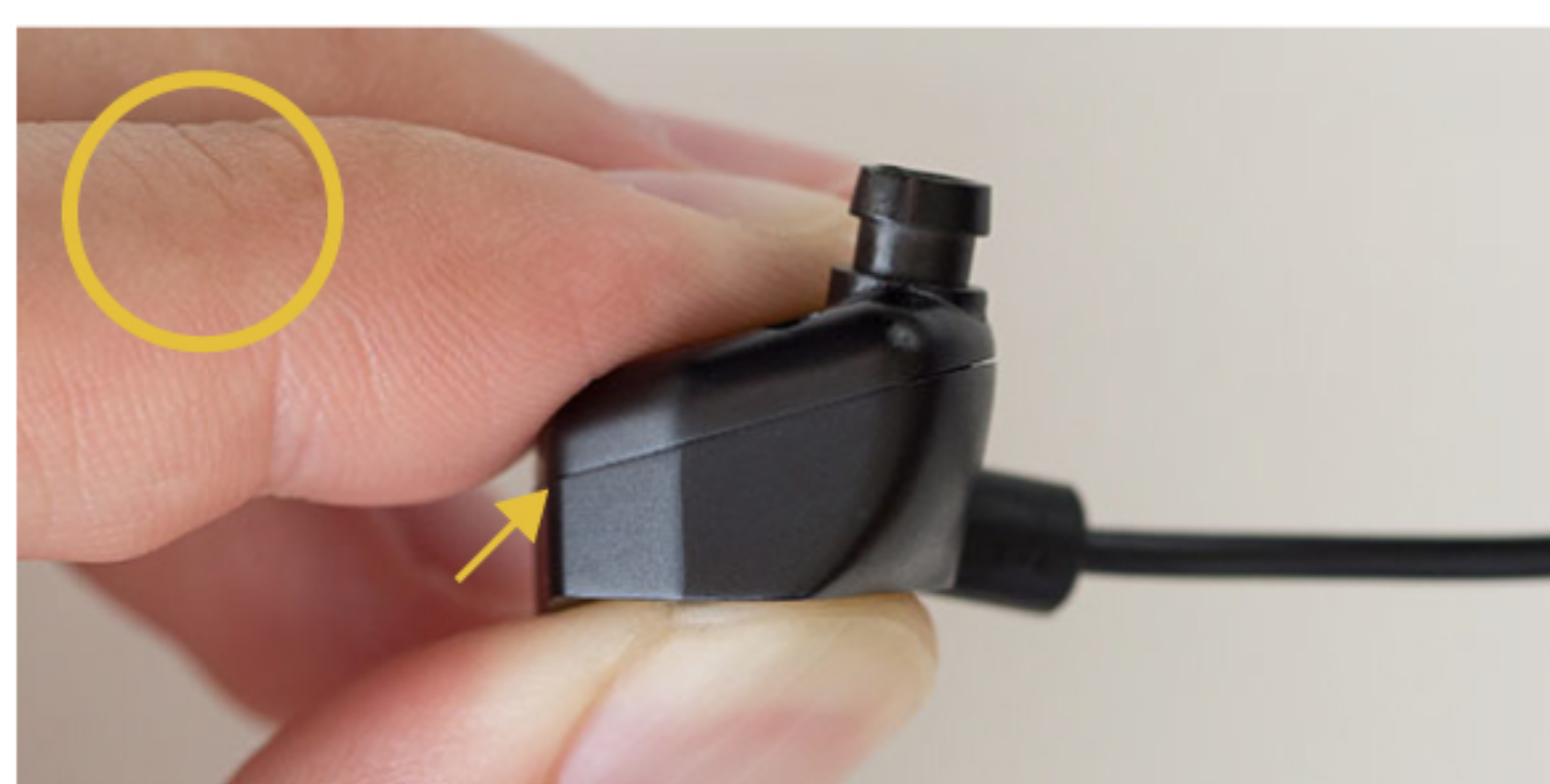


⚠ Point of Caution

✓ Be careful to ensure that internal wires do not become pinched between the front and rear housing pieces.
If there appears to be any risk of pinching the wires, push them gently inside the housing. Closing the housing with the wires pinched between the front and rear housing pieces could sever the internal electric wires.



✓ Do not forcibly tighten the bolts before the front and rear housing pieces have been firmly closed together.
Confirm proper closure of the housing pieces before tightening bolts.



✓ In the event that a gap exists between the front and rear housing pieces, please check to see whether a cable may have become pinched between the red driver holder on the front housing piece and the rear housing piece or whether a cable may have become pinched between the bolt stopper sections. If a cable has become pinched in such manner, gently reposition the electrical wire so that it will not become pinched.



★ STEP 6-2 : Tighten the bolt on the rear housing side by turning the driver clockwise until the bolt has become properly tightened.



⚠ Point

✓ Use 3 fingers to firmly support the housing.

⚠ Point of Caution

✓ Please do not overtighten the bolts because there is a risk of stripping or breaking the shaft.

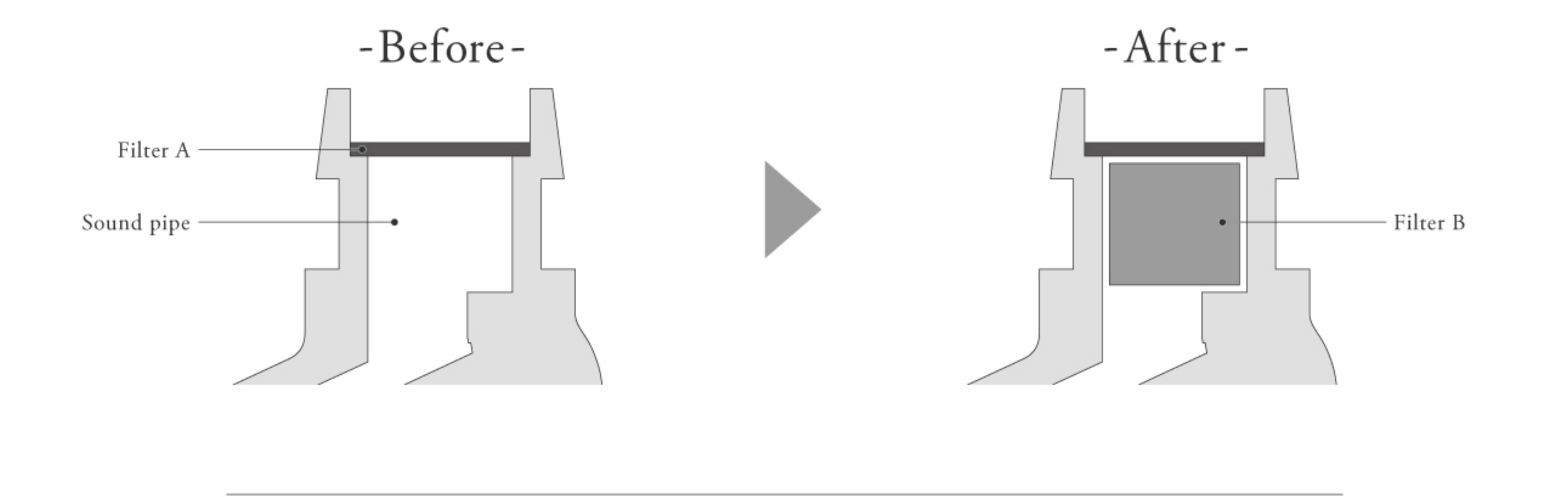
★ STEP 6-3 : Tighten the bolt on the front of the housing in the same manner by turning the driver clockwise until the bolt has become properly tightened.



★

STEP 7

Tune using 2 varieties of filters for sound pipe.



★

STEP 7-1 : Remove filter of the sound pipe with tweezers.



⚠

Point

✓ Gently grasp the edge of the filter with tweezers and gradually wriggle it loose using not one quick motion but rather a gradual process to cleanly peel away the filter.

⚠

Point of Caution

✓ In some cases, only the adhesive portions of the filter may remain. In such cases, please also thoroughly remove the adhesive portions.

★

STEP 7-2 : Please select the desired filter from among the Filter B, grasp it with tweezers and insert it into the sound pipe.



⚠

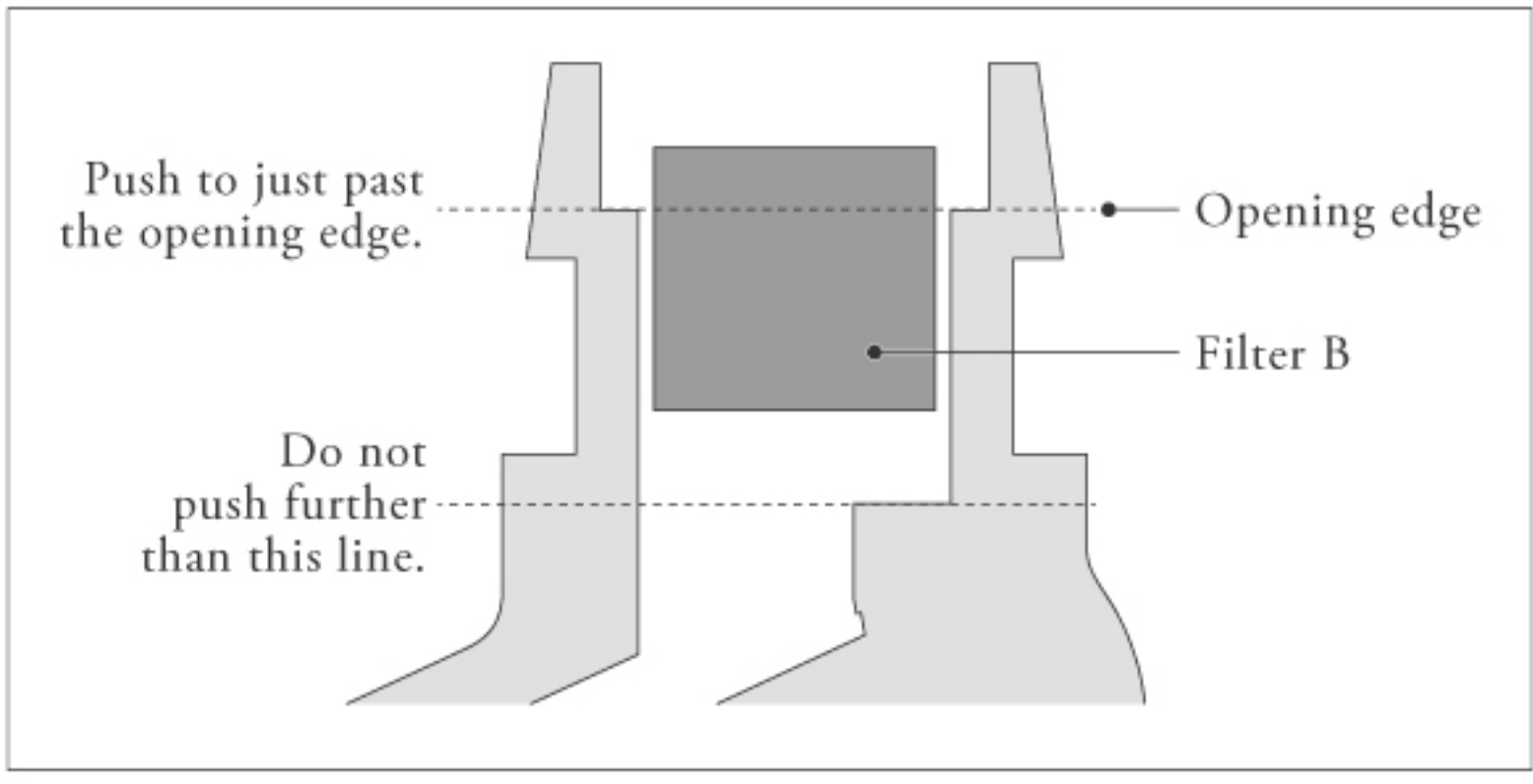
Point

✓ Please gently push the filter into the sound pipe just past the opening edge.

⚠

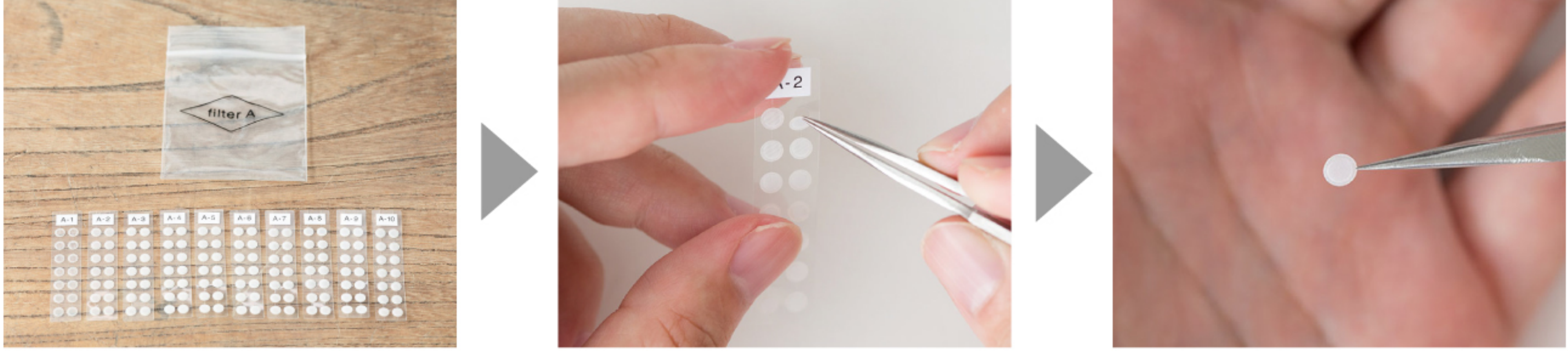
Point of Caution

✓ If the filter is pushed in too far, it may fall into the interior, so insert it only until the edge of the sound pipe becomes visible.



★

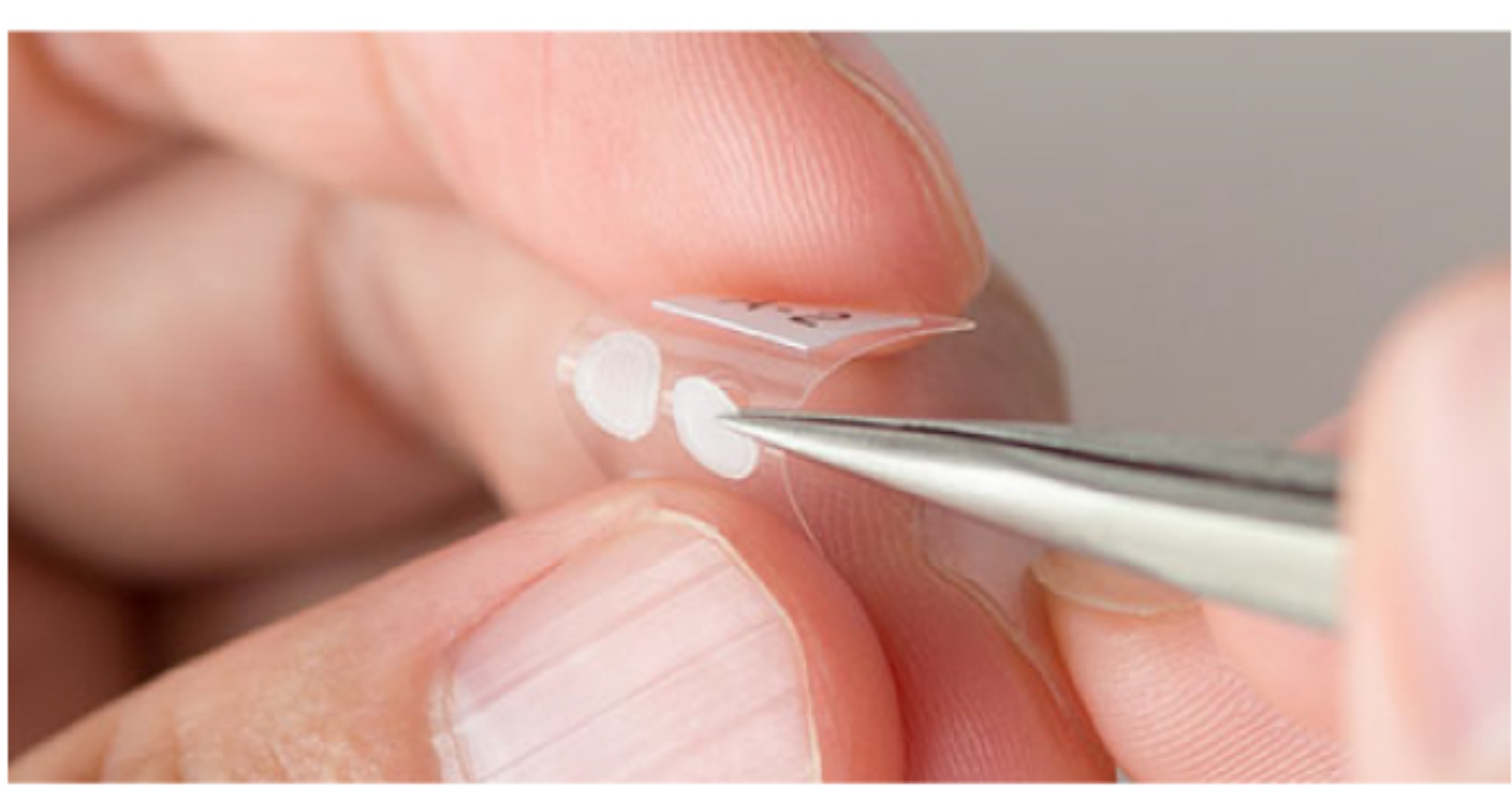
STEP 4-3 : Select the desired filter from among the Filter A and peel it away using tweezers.



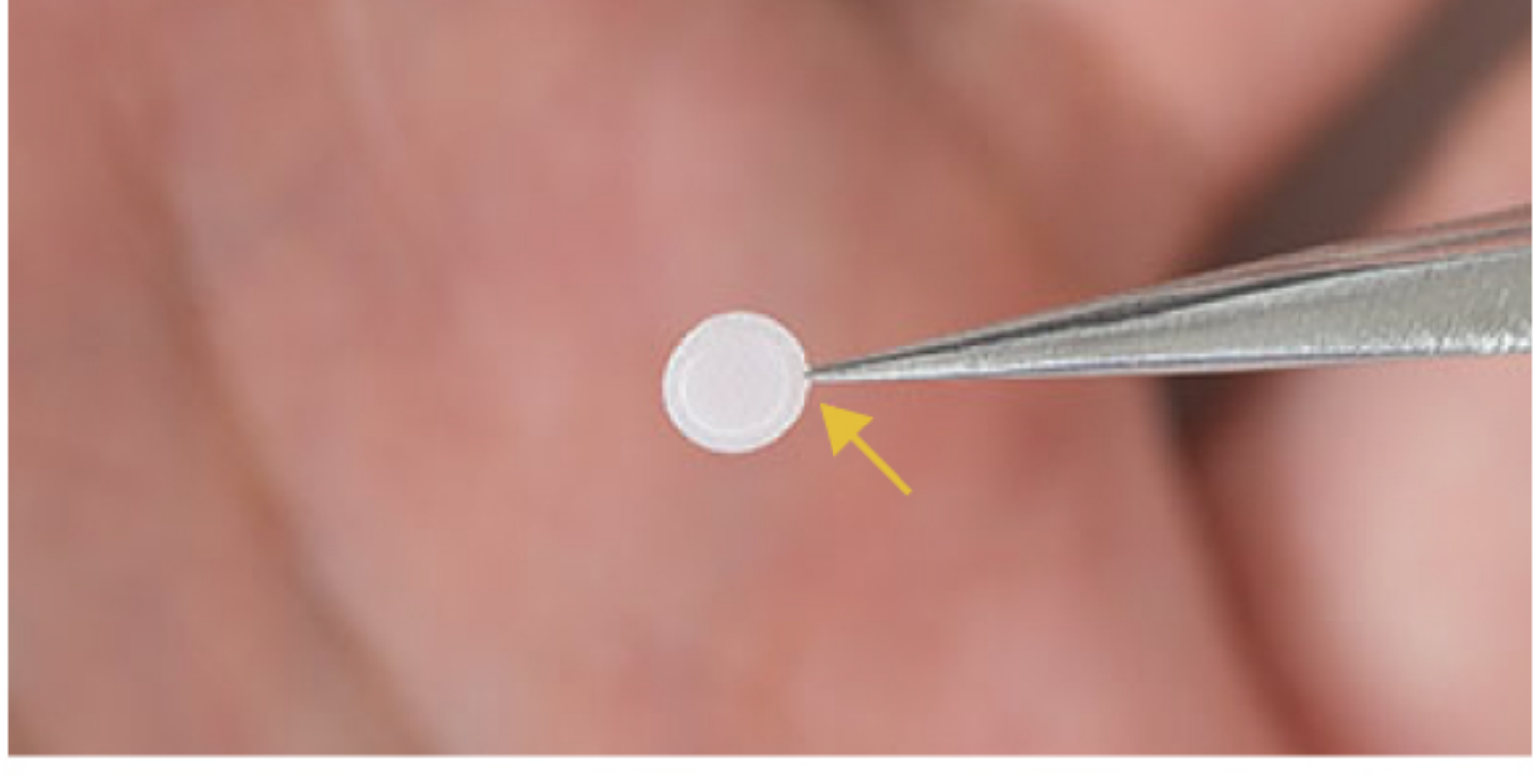
⚠

Point

✓ Reversing the sheet and popping out the filter makes it easy to peel away.



✓ Grasping the filter as far as possible toward the terminal edge will help it affix more smoothly.



⚠

Point of Caution

✓ Filters warp easily, so please refrain from pulling on them with excessive force.

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STEP 7-4 : Affix the filter to the edge of the depression in the sound pipe.

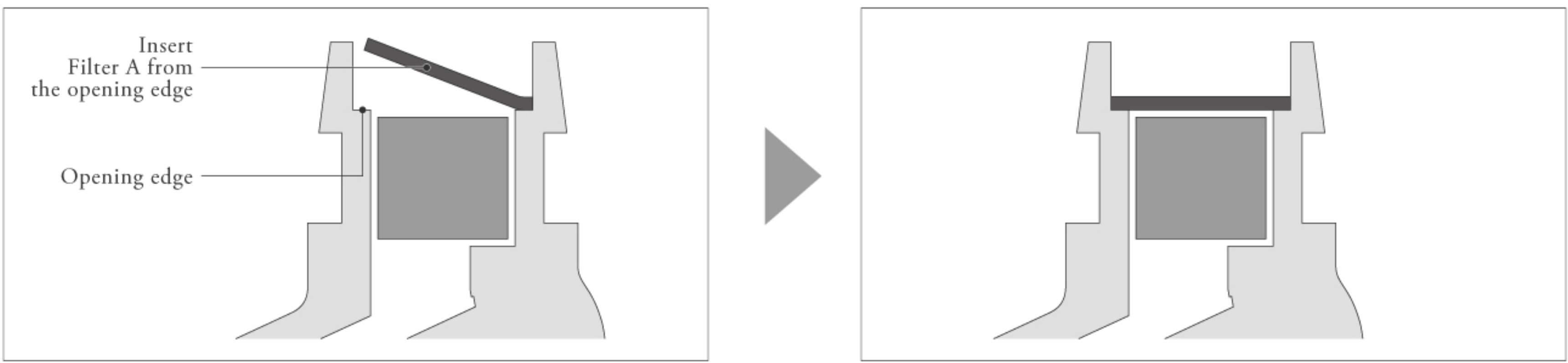


⚠

Point

✓ Insert the filter at a slight slant to the sound pipe.

Once one portion of the filter becomes affixed to the depression in the sound pipe, separate the filter from the tweezers and gently press the remaining portion until it affixes cleanly into place.



⚠

Point of Caution

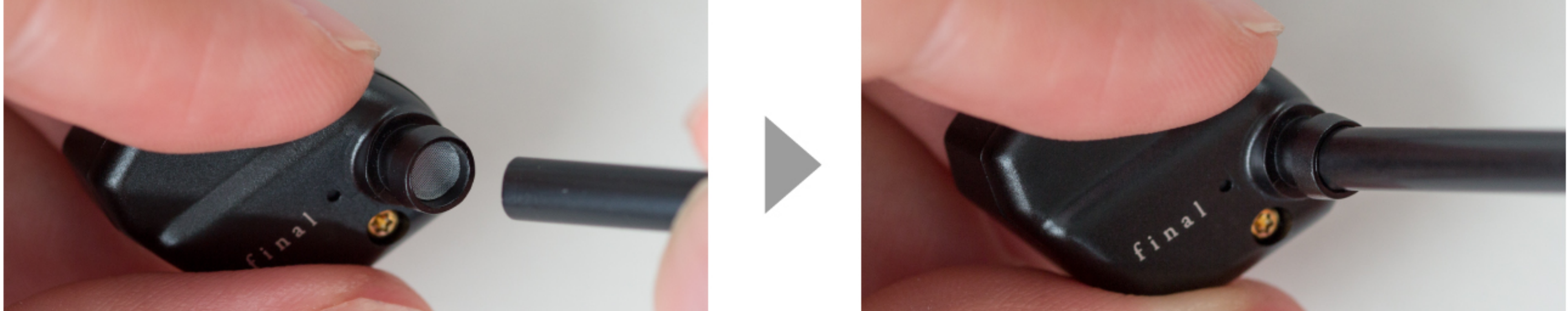
✓ Please affix the filter in precise alignment to the edge.

Take care because a misaligned filter or loose adhesive contact may cause air leakage to occur.



★

STEP 7-5 : Use the tip of the acoustic tool to lightly press the adhesive section into contact.



★
STEP 8

Attach the earpiece to the sound pipe.

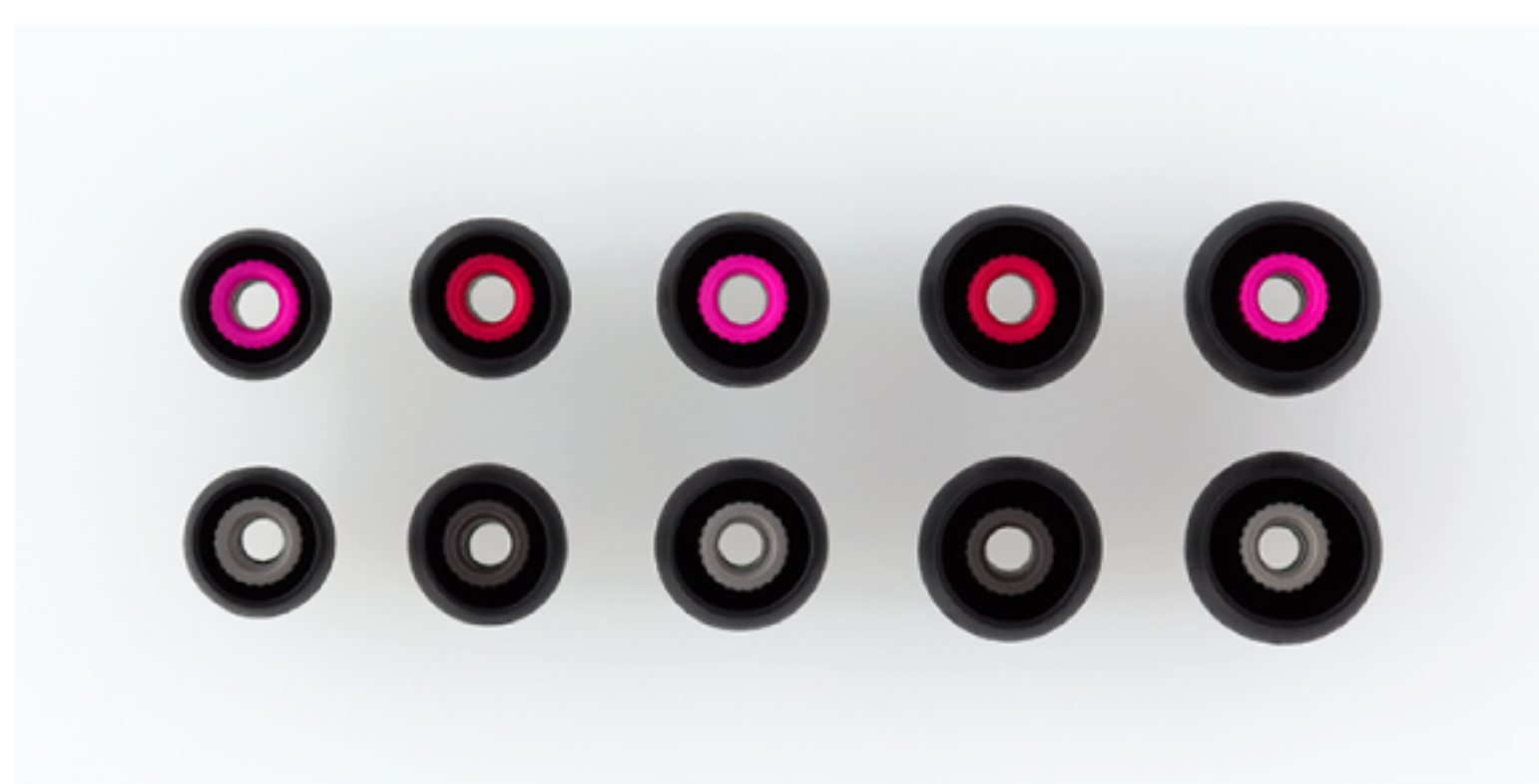
-Before-



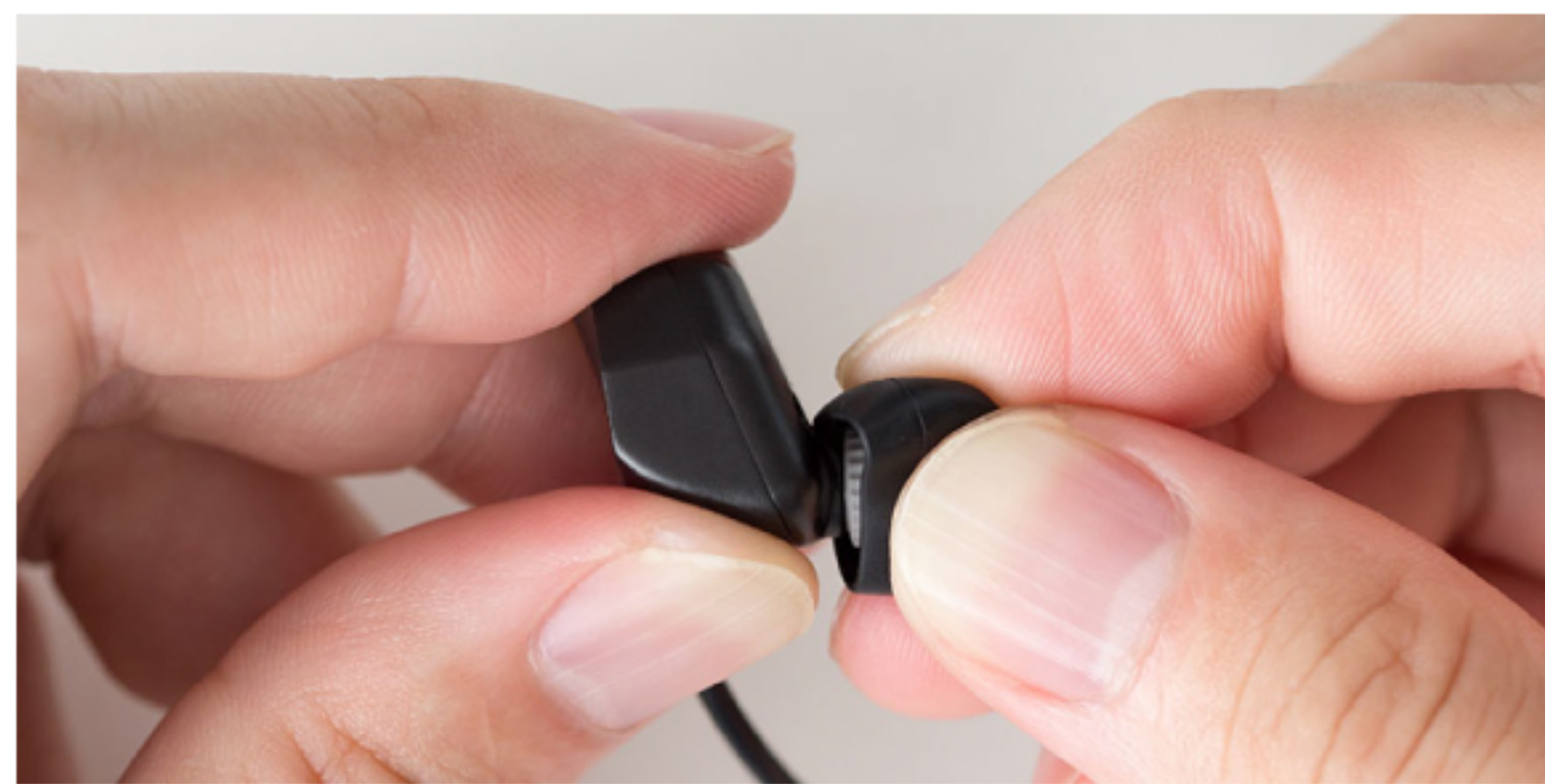
-After-



★ STEP 8-1 : Select the desired size earpiece from among the 5 sizes.



★ STEP 8-2 : Firmly grasp the earpiece between the thumb and forefinger, push the inner side of the earpiece gently into the sound pipe until it affixes properly.



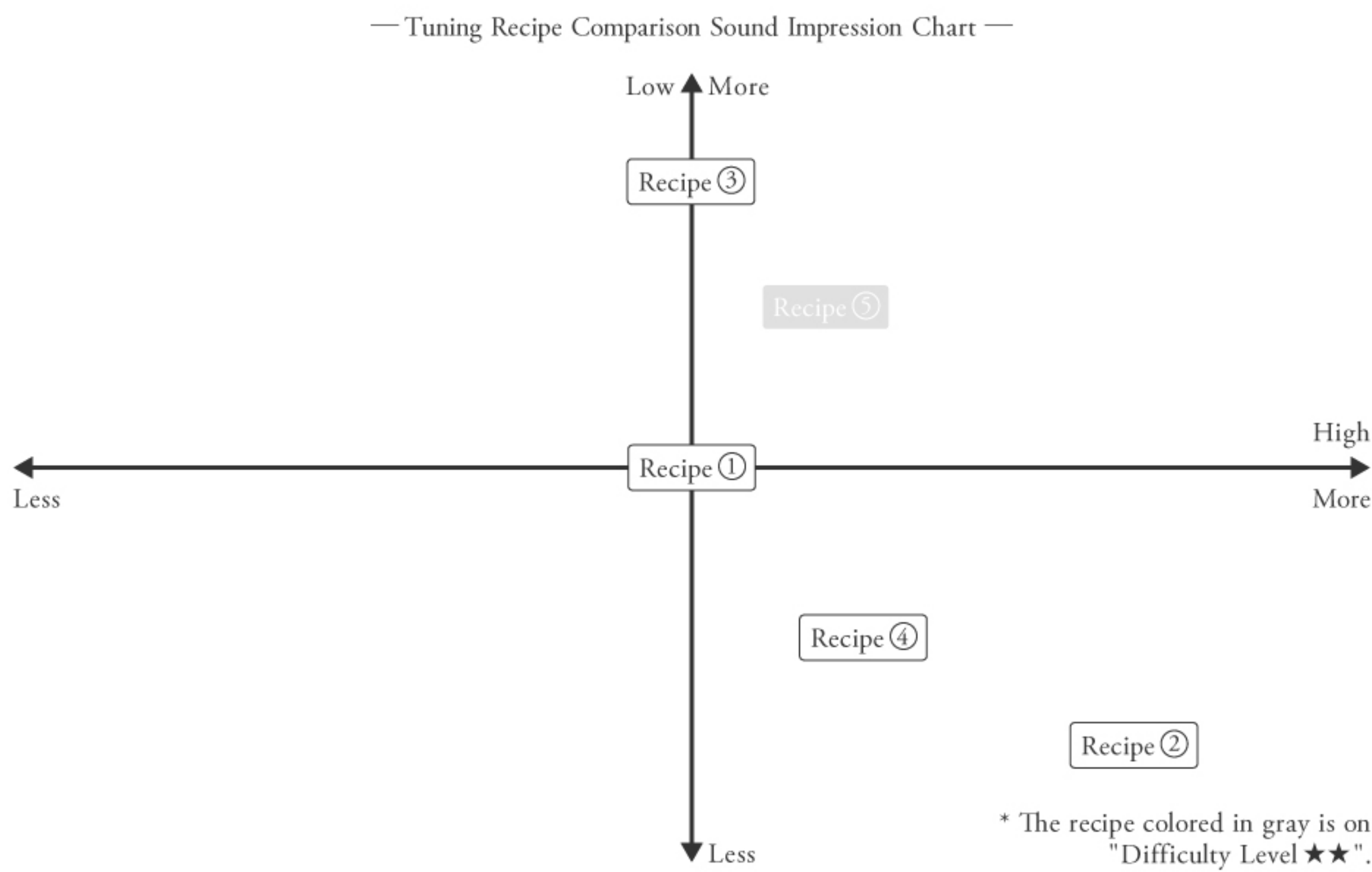
⚠ Point

✓ Do not try to insert the earpiece straight into the sound pipe.
It is easier to insert the earpiece by slightly slanting it with respect to the sound pipe.

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STEP 9

Try listening to music. Additionally, try adjusting the position of the earpiece in the sound pipe with reference to "About the Earpiece Size and Location and Sound Character" above. If not satisfied, please return to Step 1."

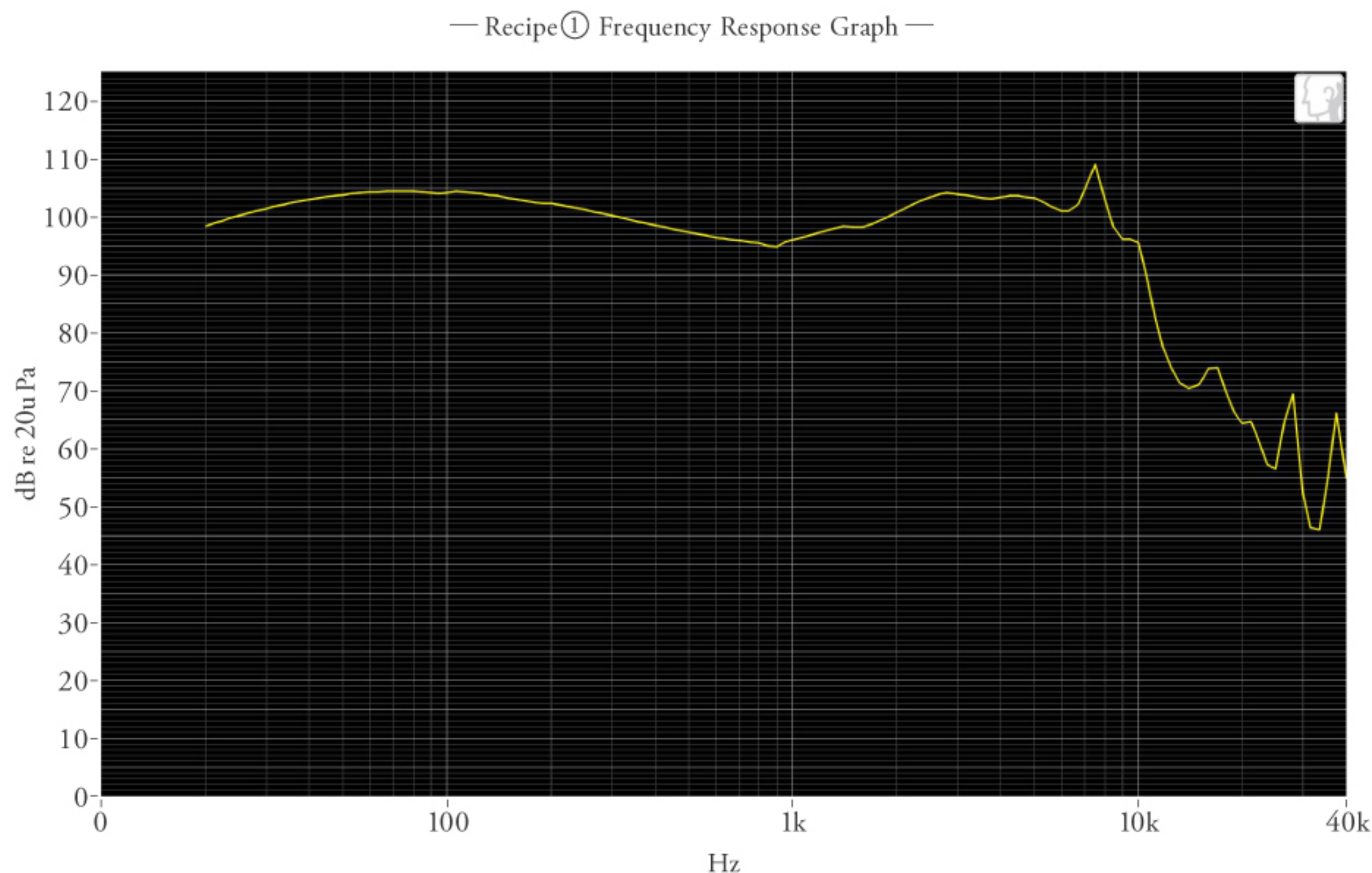
Recommended Tuning Recipe -Difficulty Level★-



Default Tuning

★Recipe① : [Sound pipe] Filter A-5+ [Sound pipe] No Filter B

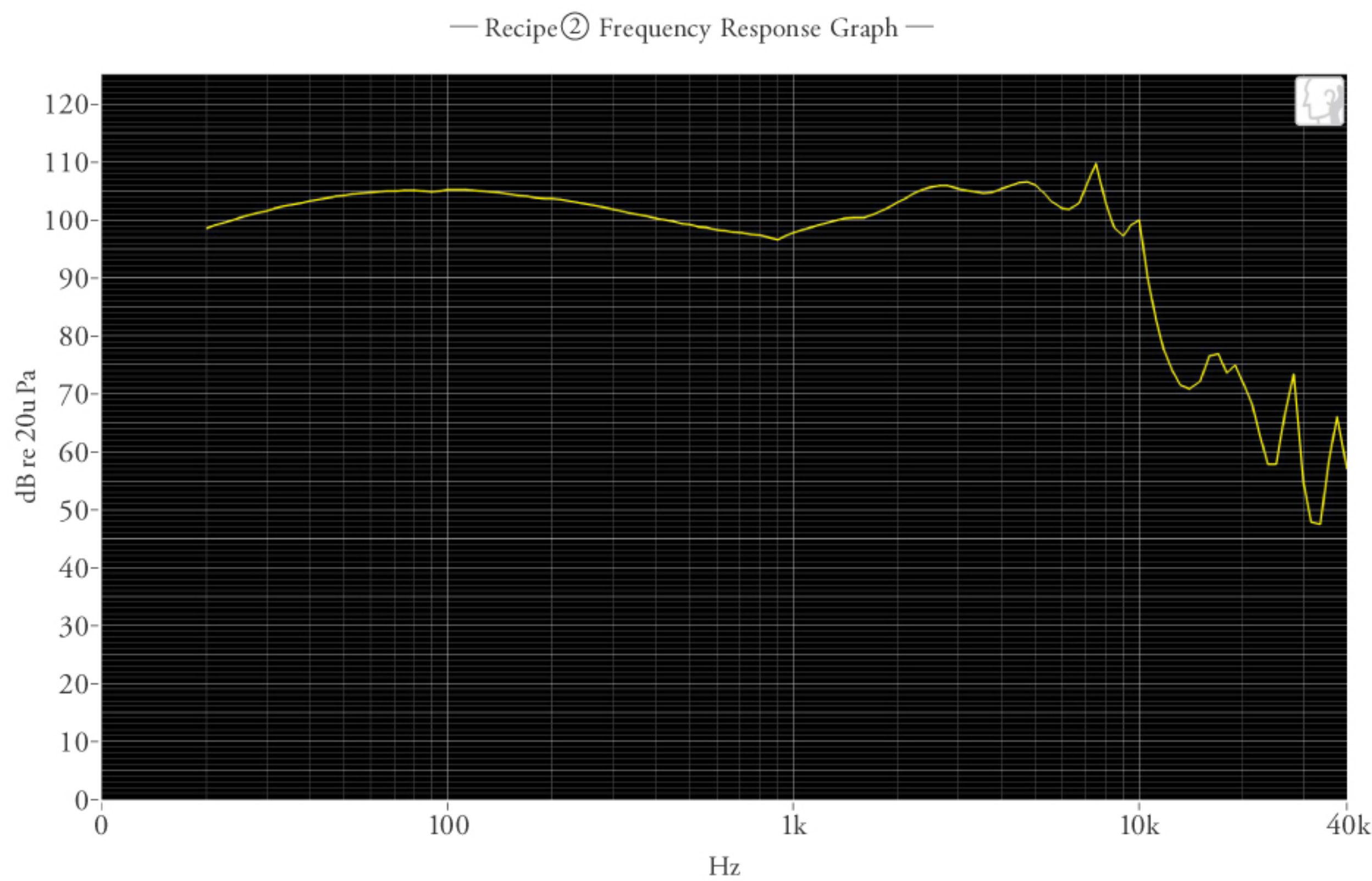
+ [Driver holder vent] Filter A-7



When tuning to shift to higher range sound than Default Tuning is desired

★Recipe② : [Sound pipe] Filter A-2+ [Sound pipe] No Filter B

+ [Driver holder vent] Filter A-7



When a slight shift to higher range sound than recipe② is desired

1 : [Sound pipe] Use a thinner Filter A (to emphasize higher range sound)

2 : [Driver holder vent] Use a thicker Filter A (to suppress lower range sound)

When a slight shift to lower range sound than recipe② is desired

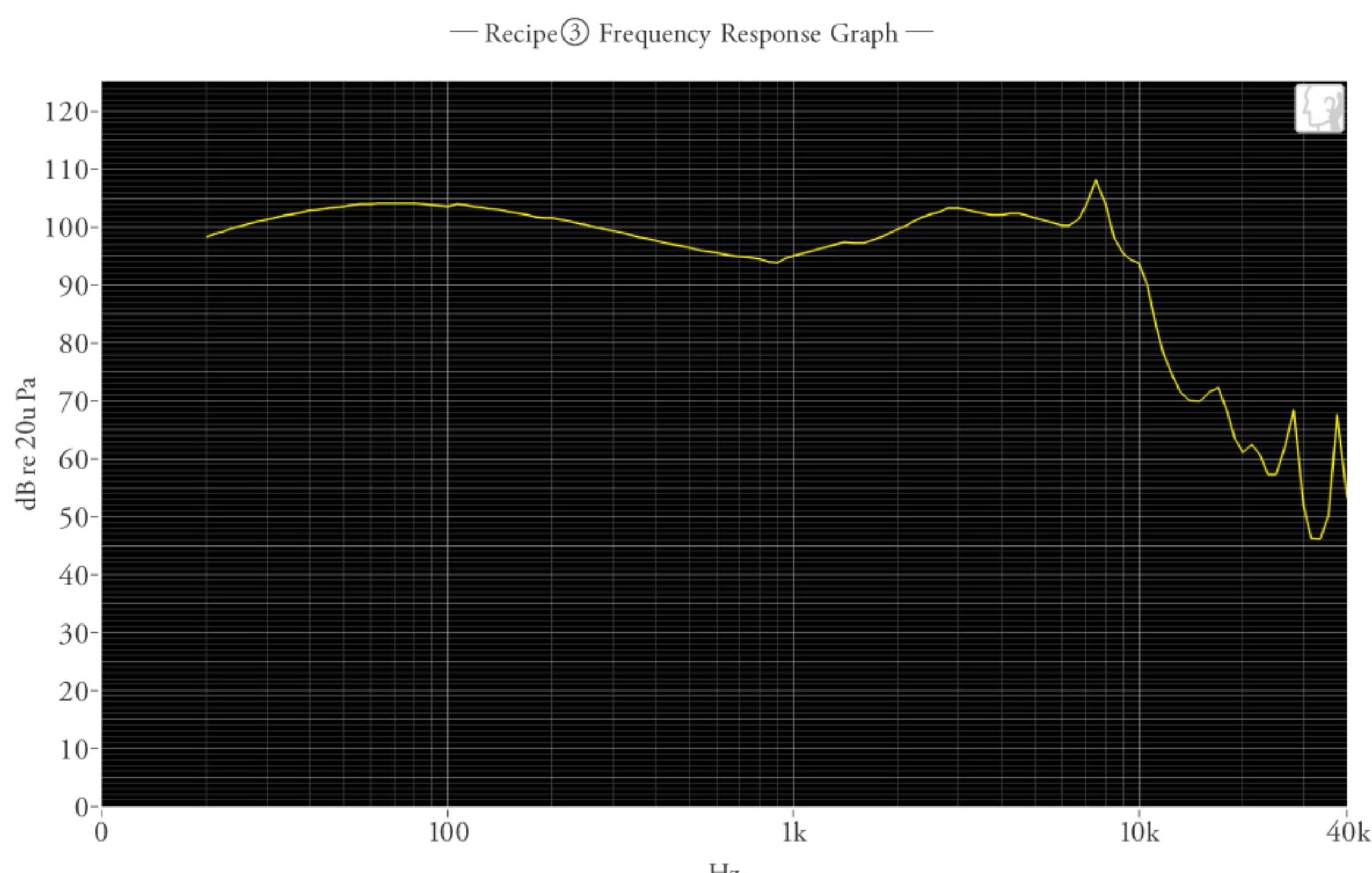
1 : [Sound pipe] Use Filter B (to suppress higher range sound)

2 : [Front housing vent] Use a thinner Filter A (to emphasize lower range sound)

When tuning to shift to lower range sound than Default Tuning is desired

★Recipe③ : [Sound pipe] Filter A-6+ [Sound pipe] No Filter B

+ [Driver holder vent] Filter A-7



When a slight shift to higher range sound than recipe③ is desired

1 : [Sound pipe] Use a thinner Filter A (to emphasize higher range sound)

2 : [Driver holder vent] Use a thicker Filter A (to suppress lower range sound)

When a slight shift to lower range sound than recipe③ is desired

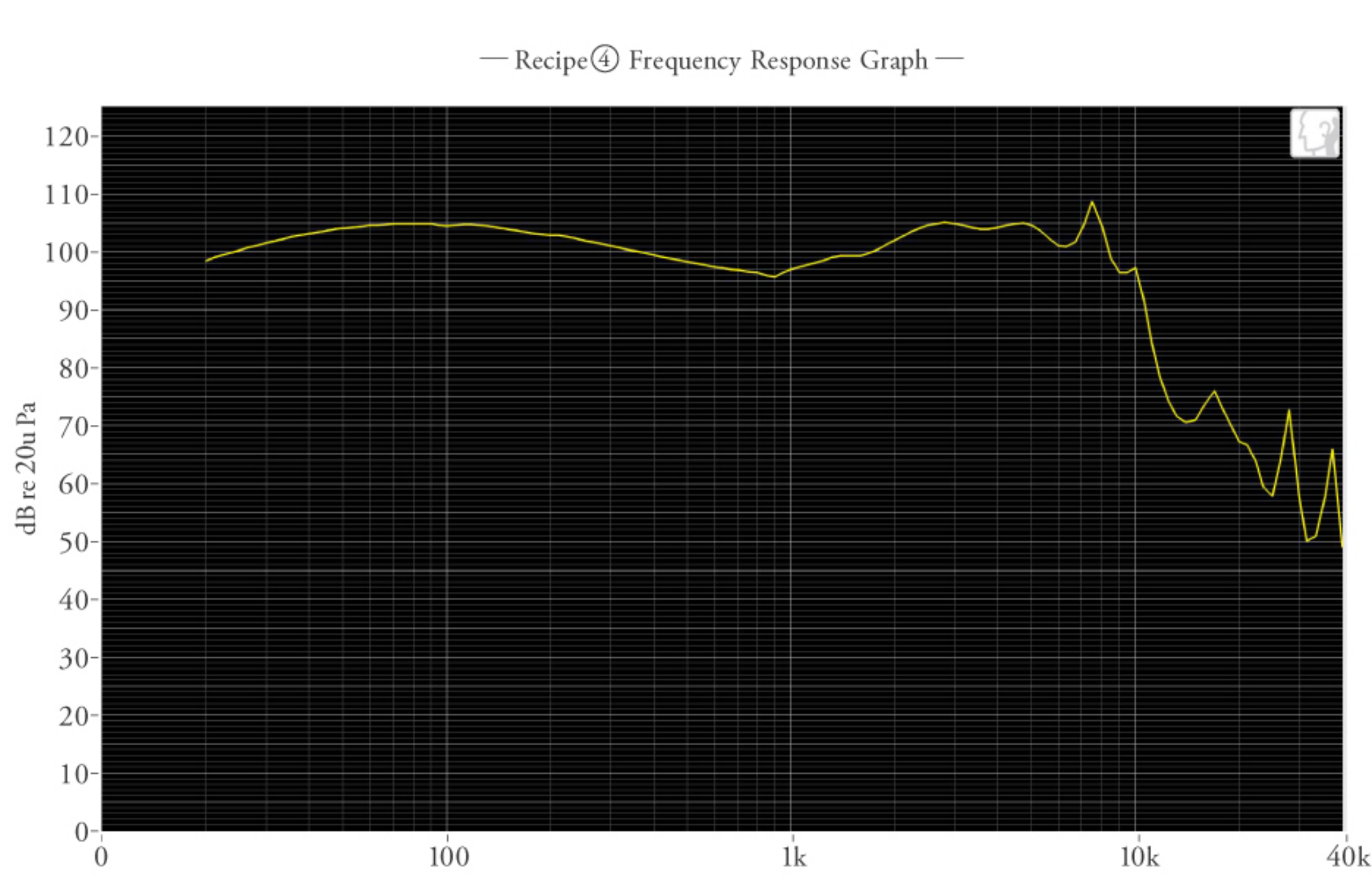
1 : [Sound pipe] Use Filter B (to emphasize higher range sound)

2 : [Driver holder vent] Use a thinner Filter A (to emphasize lower range sound)

When a shift from Default Tuning to an emphasis on vocals is desired

★Recipe④ : [Sound pipe] Filter A-4+ [Sound pipe] No Filter B

+ [Driver holder vent] Filter A-7



When a slight shift to higher sound than recipe④ is desired

1 : [Sound pipe] Use a thinner Filter A (to emphasize higher range sound)

2 : [Driver holder vent] Use a thicker Filter A (to suppress lower range sound)

When a slight shift to lower range sound than recipe④ is desired

1 : [Sound pipe] Use Filter B (to suppress higher range sound)

2 : [Driver holder vent] Use a thinner Filter A (to emphasize lower range sound)

About the Sound Character for Each Filter -Difficulty Level★★-

★★ Filter C

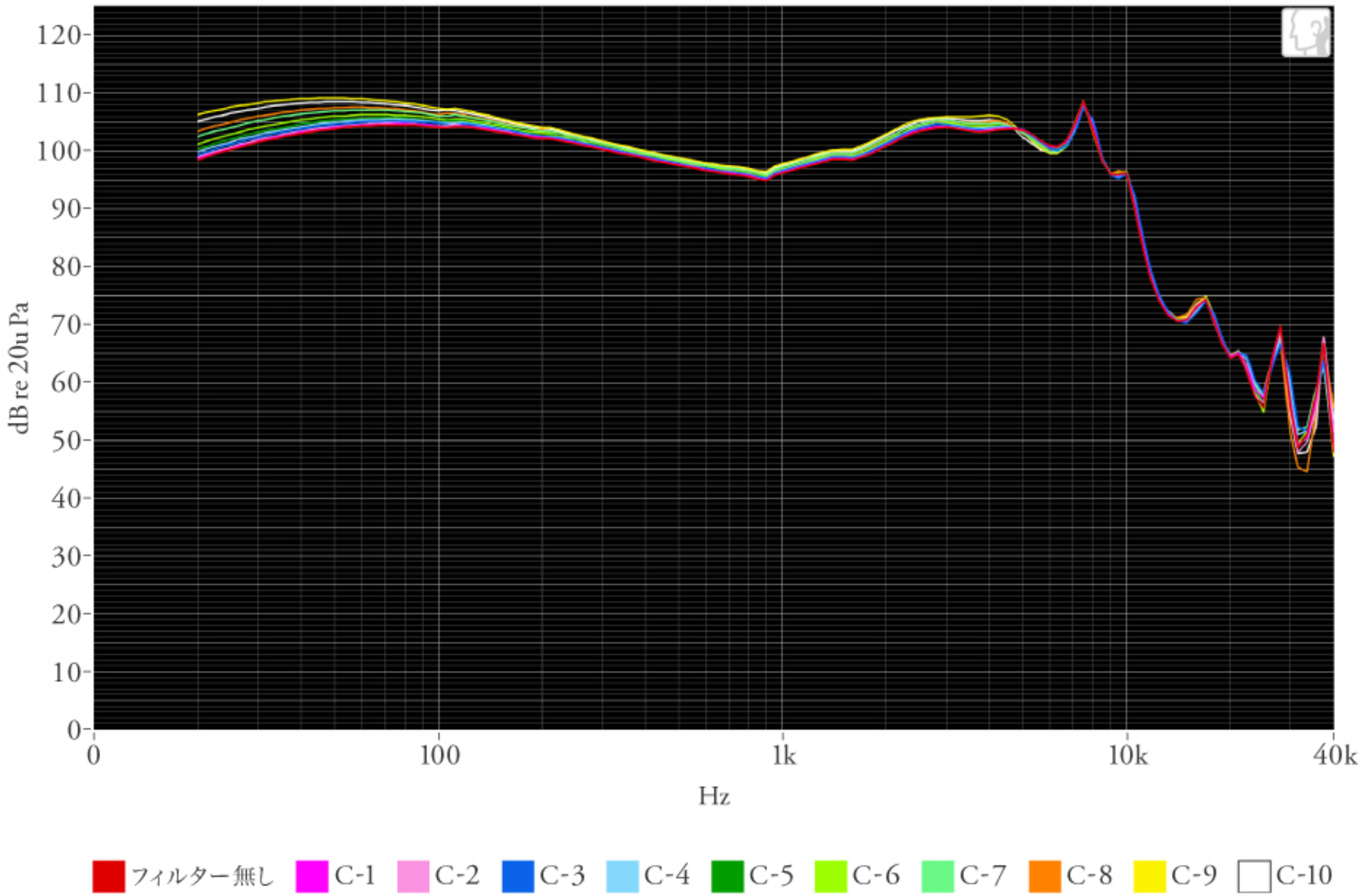
Affixing a Filter C (sold separately) to the front housing vent allows for an increase in sound pressure of lower range sound.
Because a similar effect can be achieved using Filter A, users who find Filter C small and difficult to affix may choose to affix a Filter A instead (in which case the final logo may be partially concealed.)

- * Filter C is not included with this product. For purchase, please contact the store you purchased the product.
- * With regard to Filter C-9 and C-10, the precision of Filter C-10 is higher, but the breadth of the increase in low-range sound pressure is greater with Filter C-9 due to other factors.

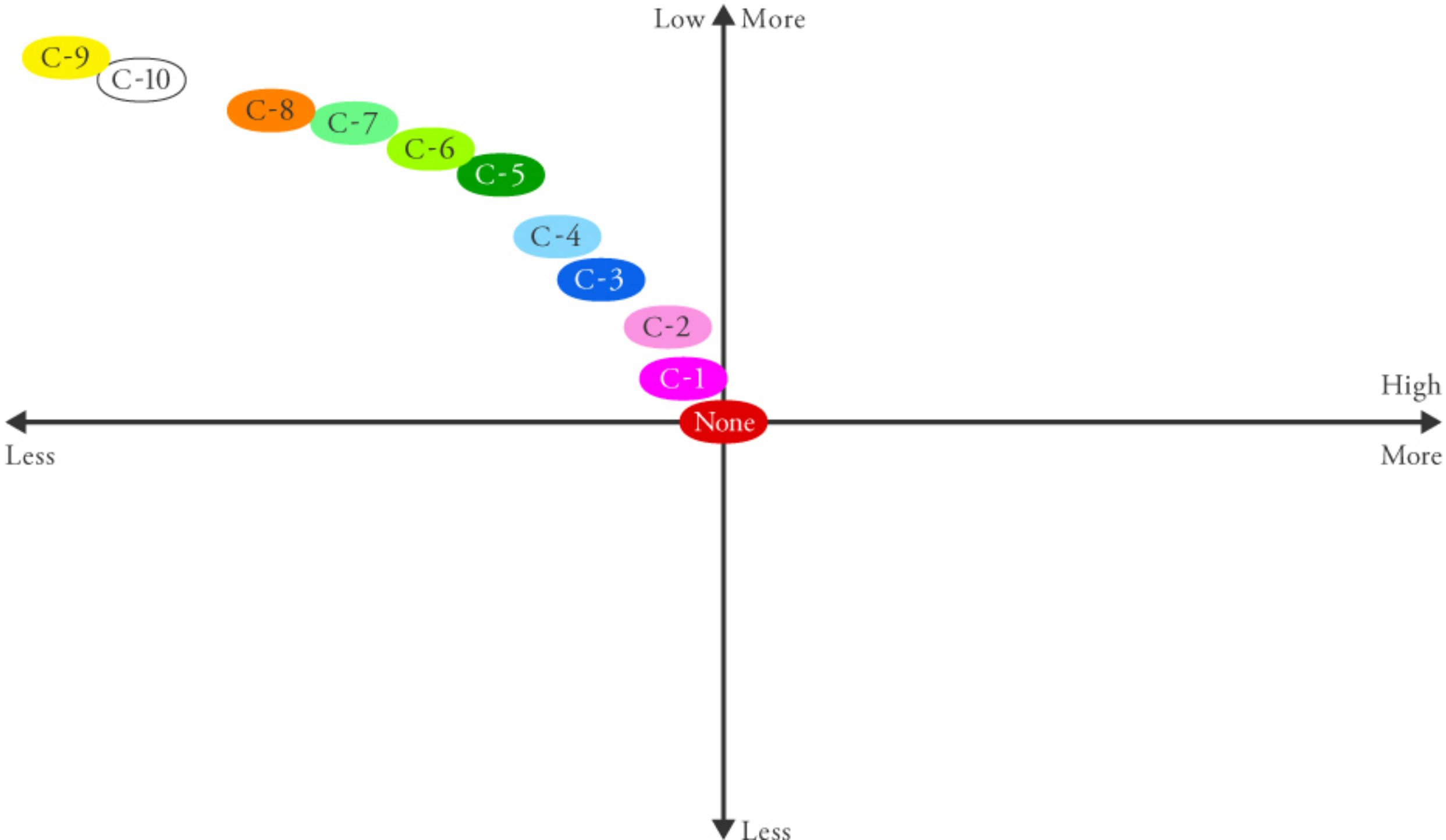
⚠ Points of Caution

- ✓ Because the flow of air may be impeded if the adhesive portion of the edge of the filter covers the opening, please affix the filter so that the adhesive portion does not cover the opening.

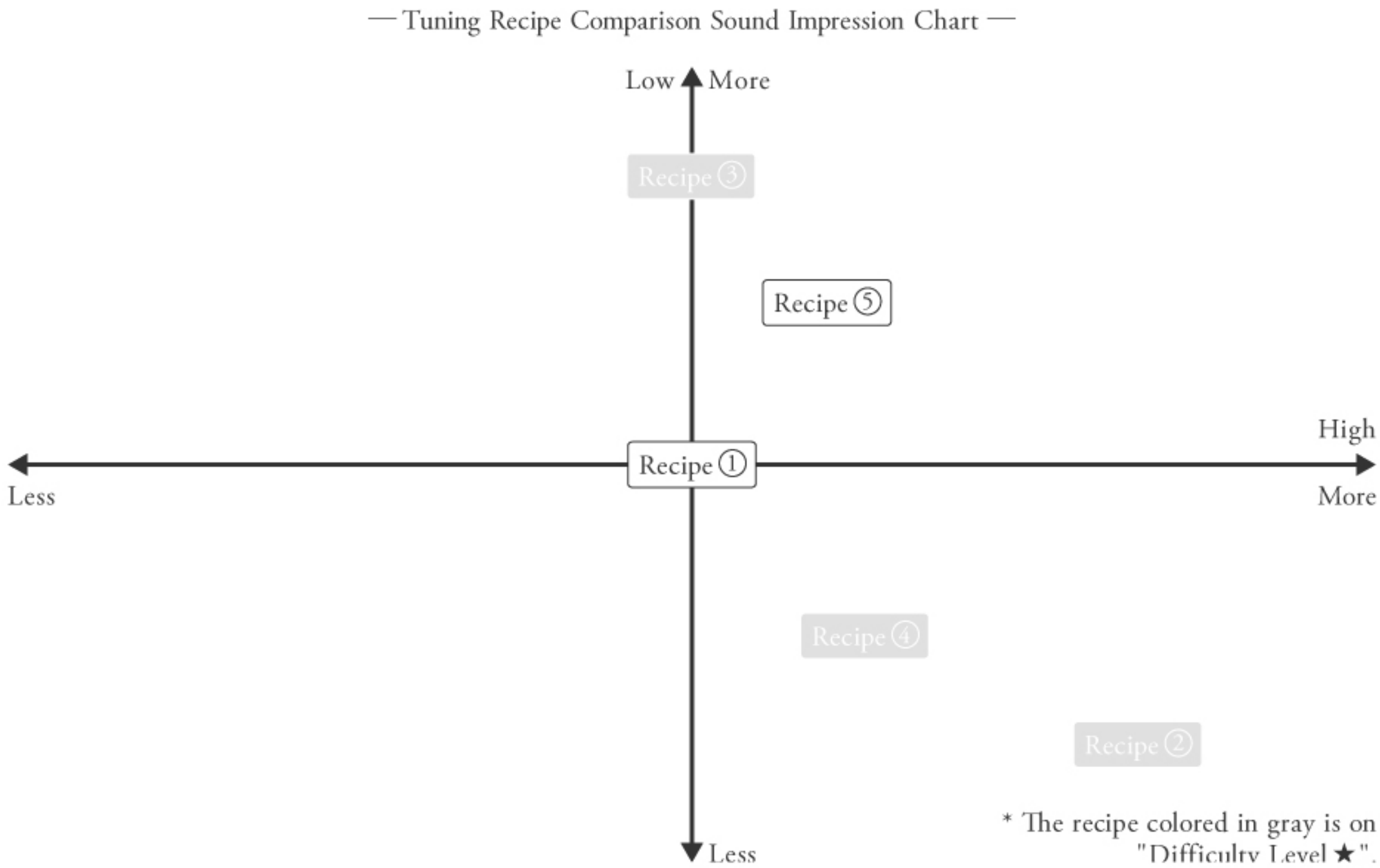
— Filter C Frequency Response Graph —



— Filter C Sound Impression Distribution Chart —

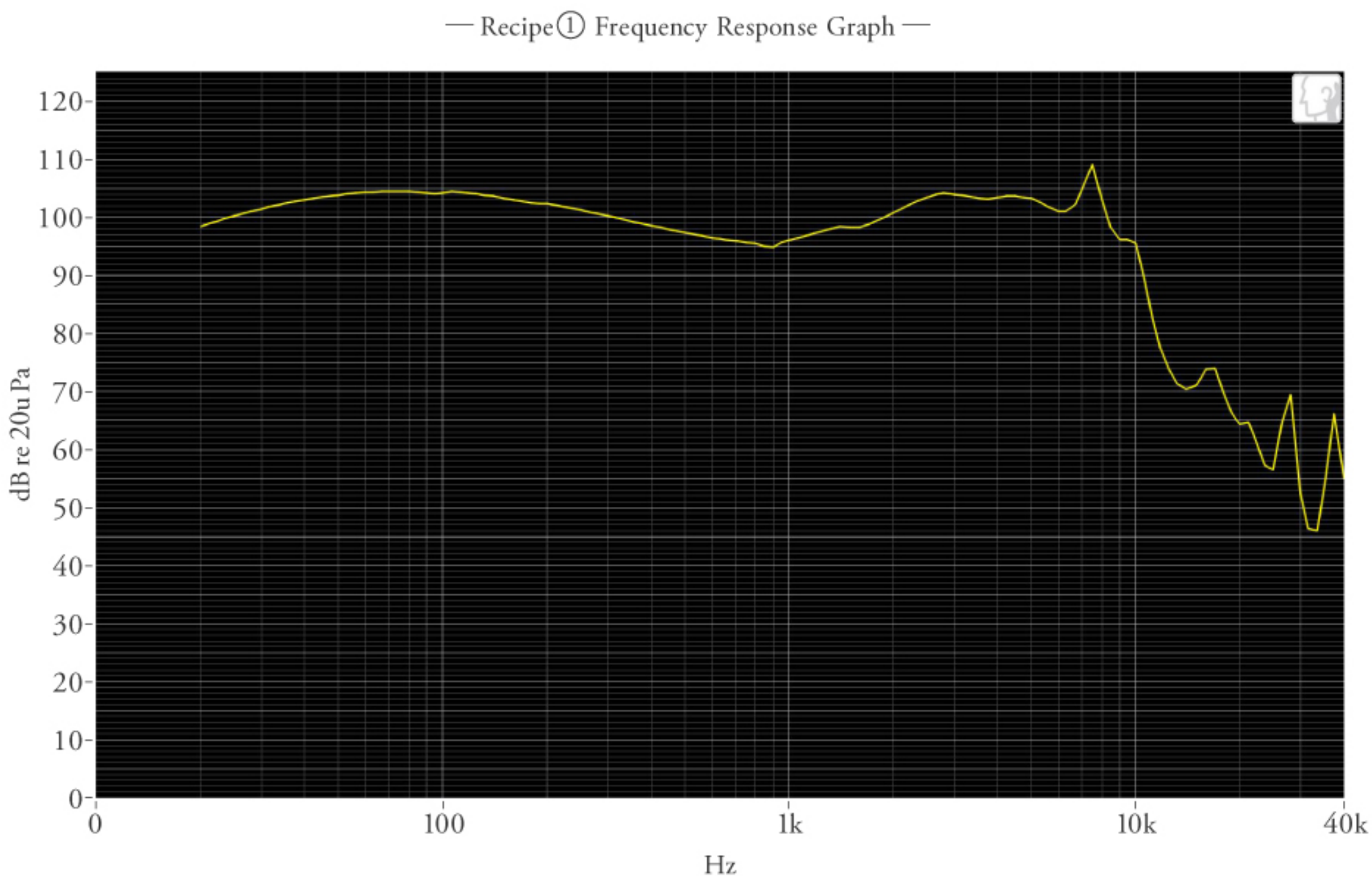


Recommended Tuning Recipe -Difficulty Level★★-



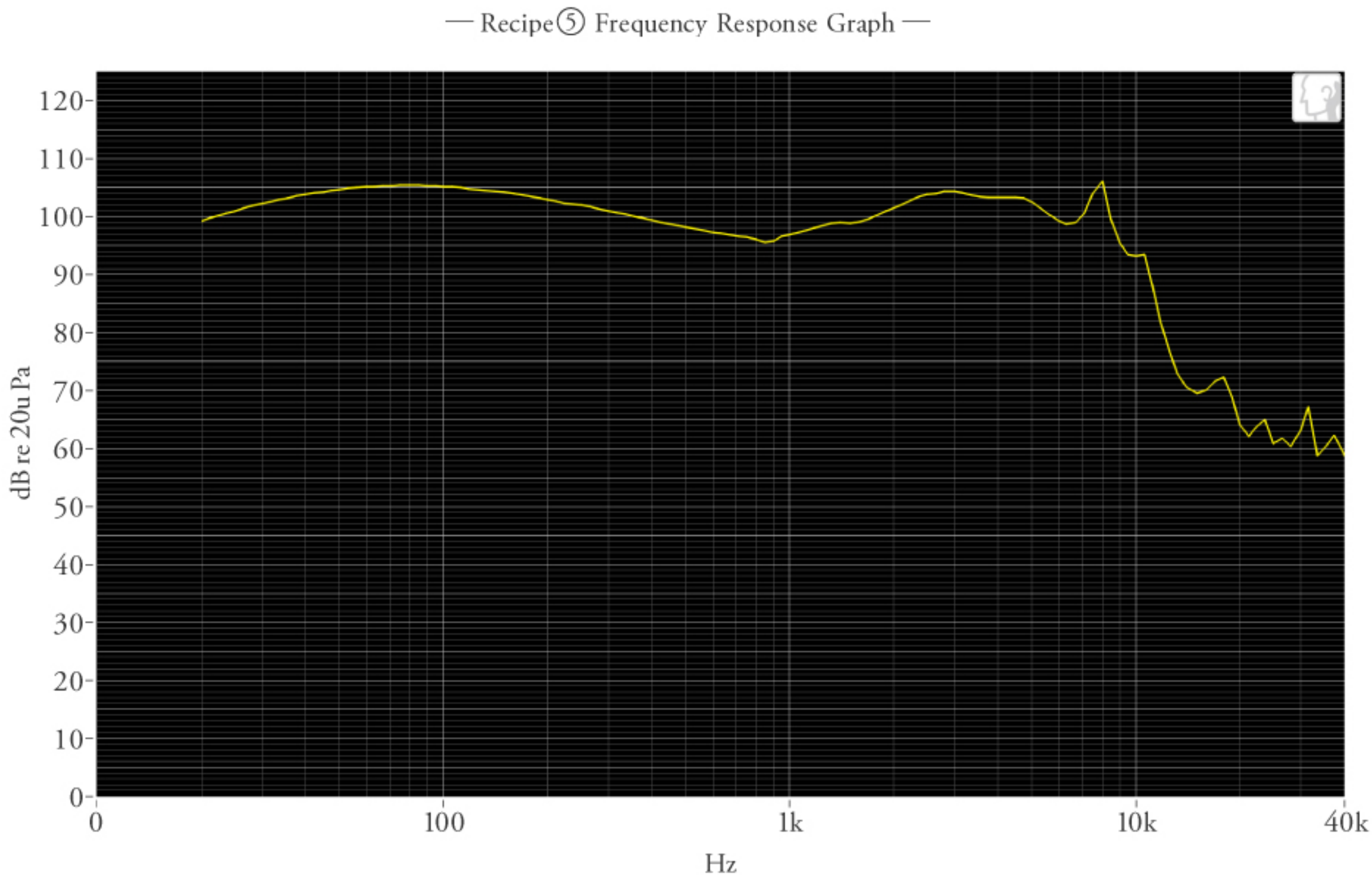
Default Tuning

★Recipe ① : [Sound pipe] Filter A-5+[Sound pipe] No Filter B
+[Driver holder vent] Filter A-7



Utilizing Difficulty Level★★

★★Recipe ⑤ : [Sound pipe] Filter A-5+[Sound pipe] Filter B-4
+[Driver holder vent] No Filter A
+[Front housing vent] Filter C-2



When a slight shift to higher range sound than recipe ⑤ is desired

- 1 : [Sound pipe]Use a thinner Filter A (to emphasize higher range sound)
- 2 : [Driver holder vent]Use a thicker Filter A (to suppress lower range sound)

When a slight shift to lower range sound than recipe ⑤ is desired

- 1 : [Sound pipe]Use Filter B (to suppress higher range sound)
- 2 : [Front holder vent]Use a thinner Filter A (to emphasize lower range sound)
- 2 : [Front housing vent]Use a thicker Filter C (to emphasize lower range sound)

Tuning Steps -Difficulty Level★★-
(between STEP7 and 8 of difficulty level★)

★★

STEP 1

(Perform the following procedures on either the Left or Right side.
Once Step 3 has been completed, return to Step 1 and perform the same procedures on the other side.)

Tune by affixing a filter to the front housing vent.

* Filter C is not included with this product. For purchase, please contact the store you purchased the product.

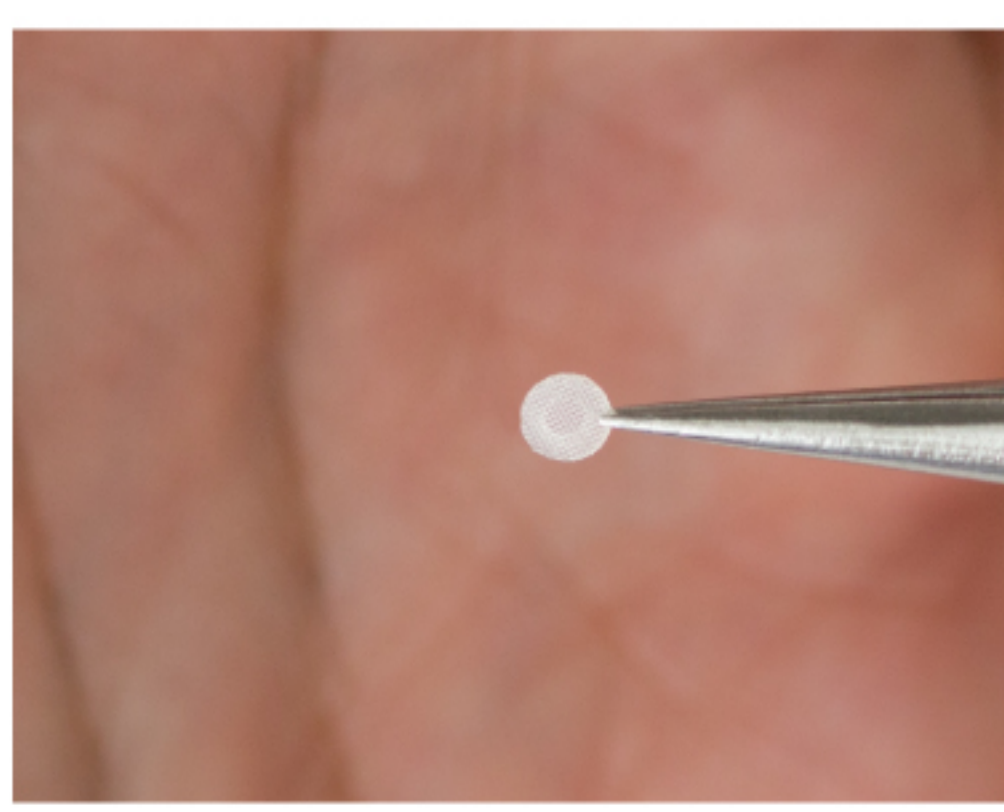
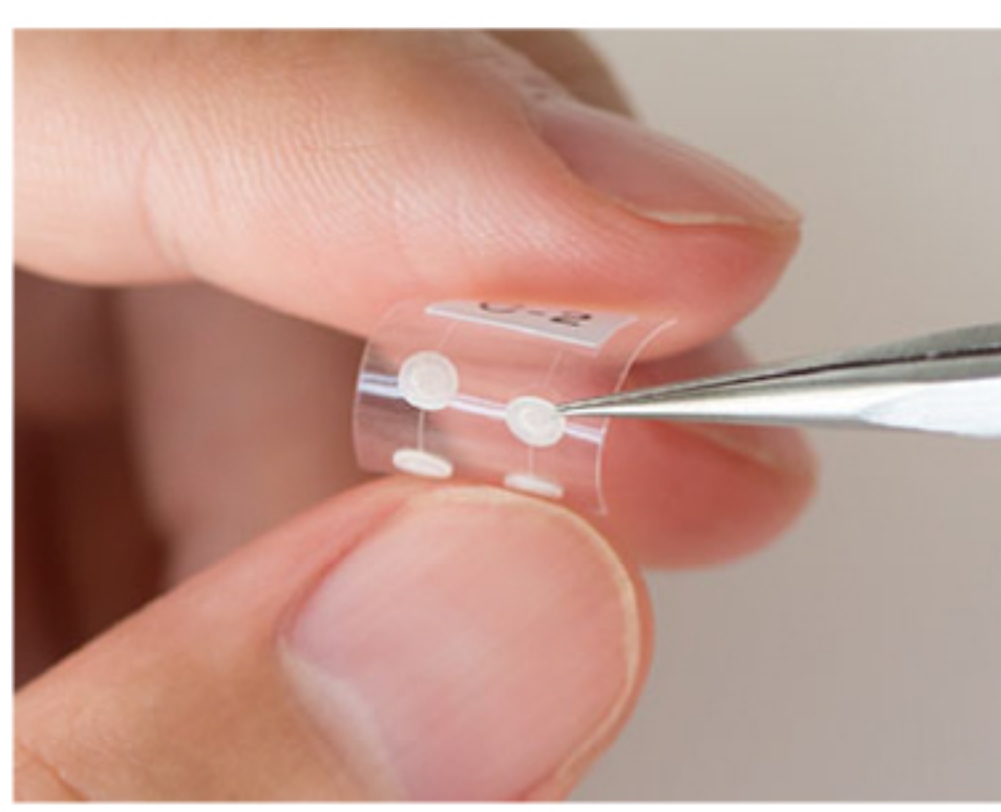
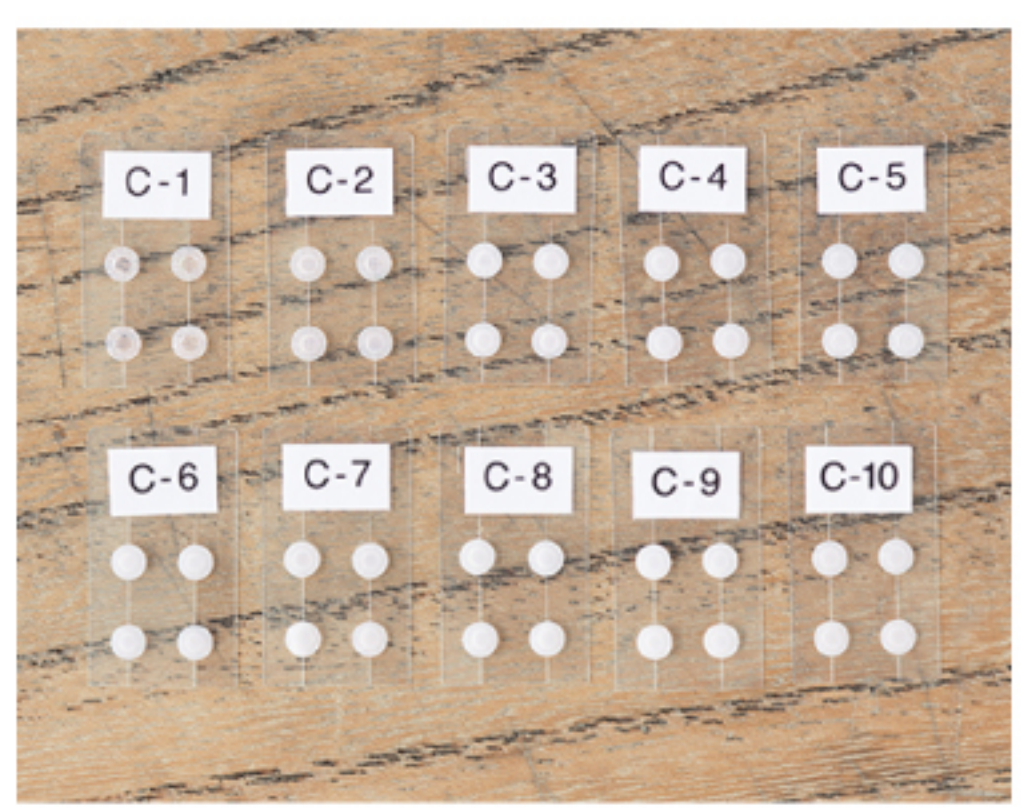
-Before-



-After-



★★ STEP 1-1 : Grasp the earpiece firmly between the index finger and thumb and pull gently with a slight twisting motion to remove it from the housing.

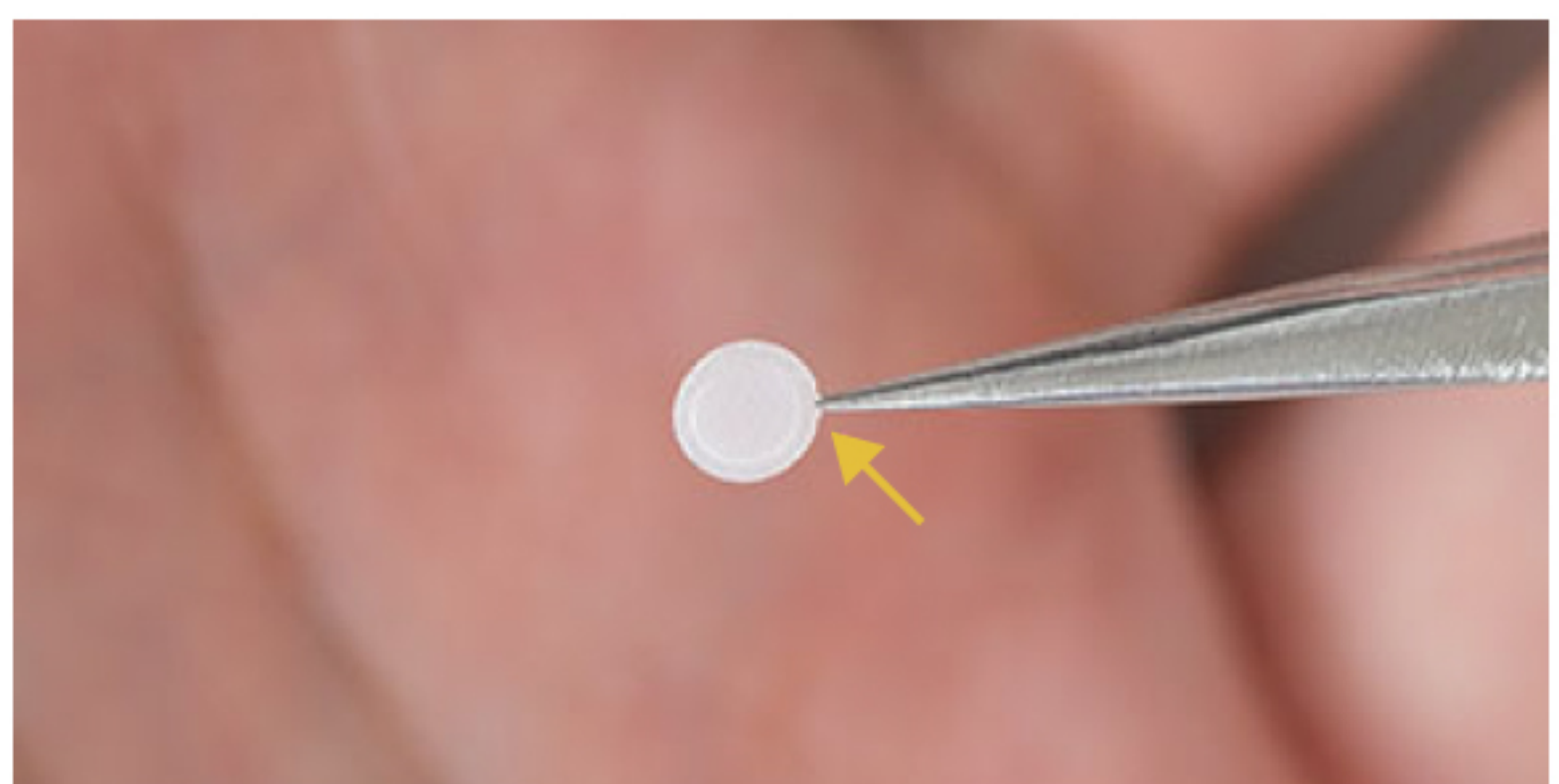


⚠ Point

✓ Reversing the sheet and popping out the filter makes it easy to peel away.



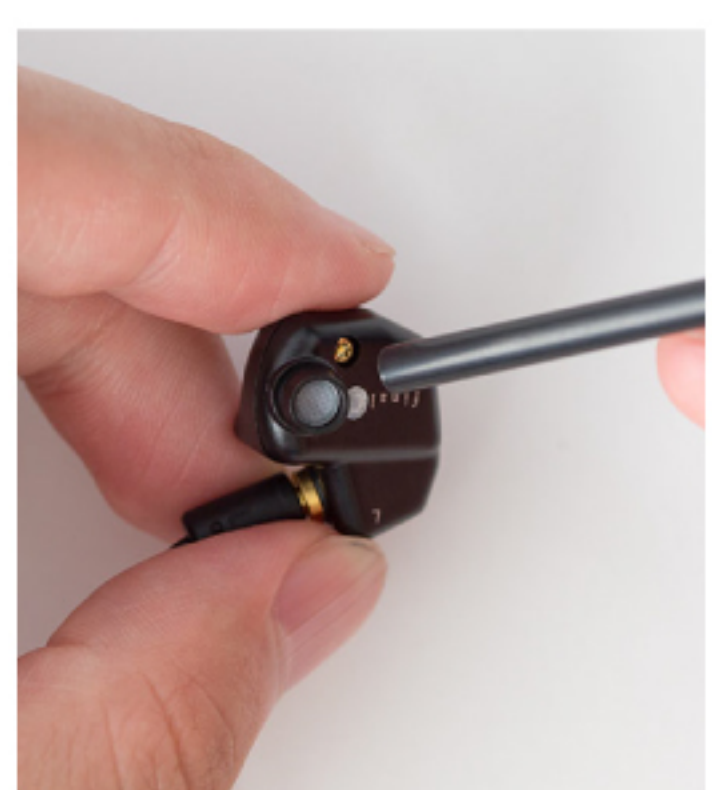
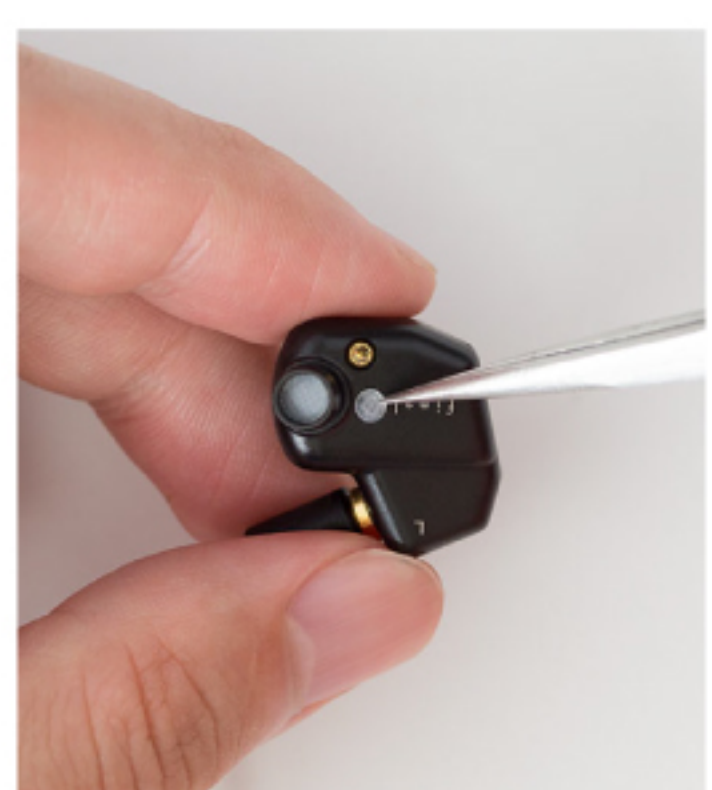
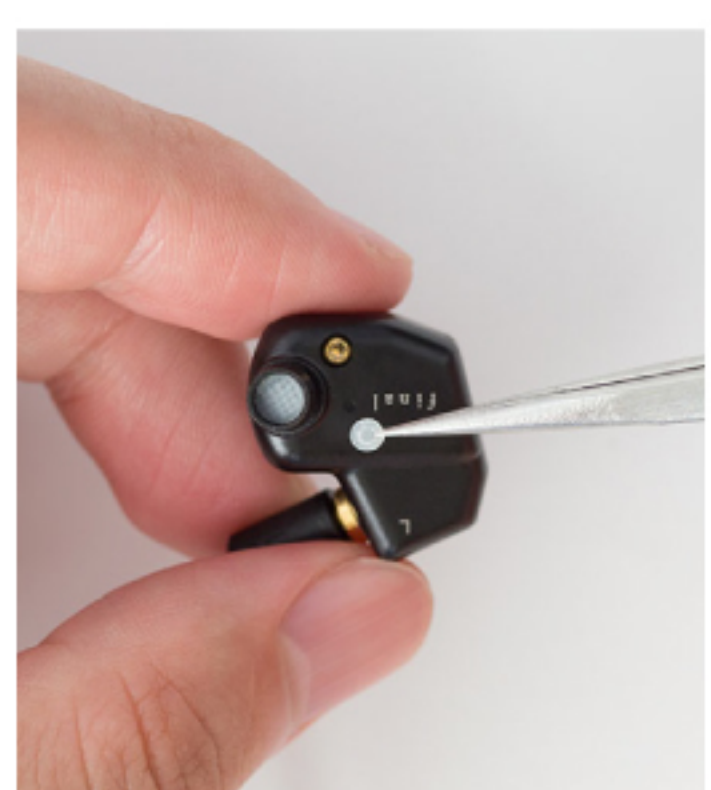
✓ Grasping the filter as far as possible toward the terminal edge will help it affix more smoothly.



⚠ Point of Caution

✓ Filters warp easily, so please refrain from pulling on them with excessive force.

★★ STEP 1-2 : To affix the filter to the vent, push the adhesive section very gently with the tip of the acoustic tool.



⚠ Point

✓ Once part of the filter has been affixed to the housing, separate the filter from the tweezers and push gently on the remaining portion until it affixes cleanly.

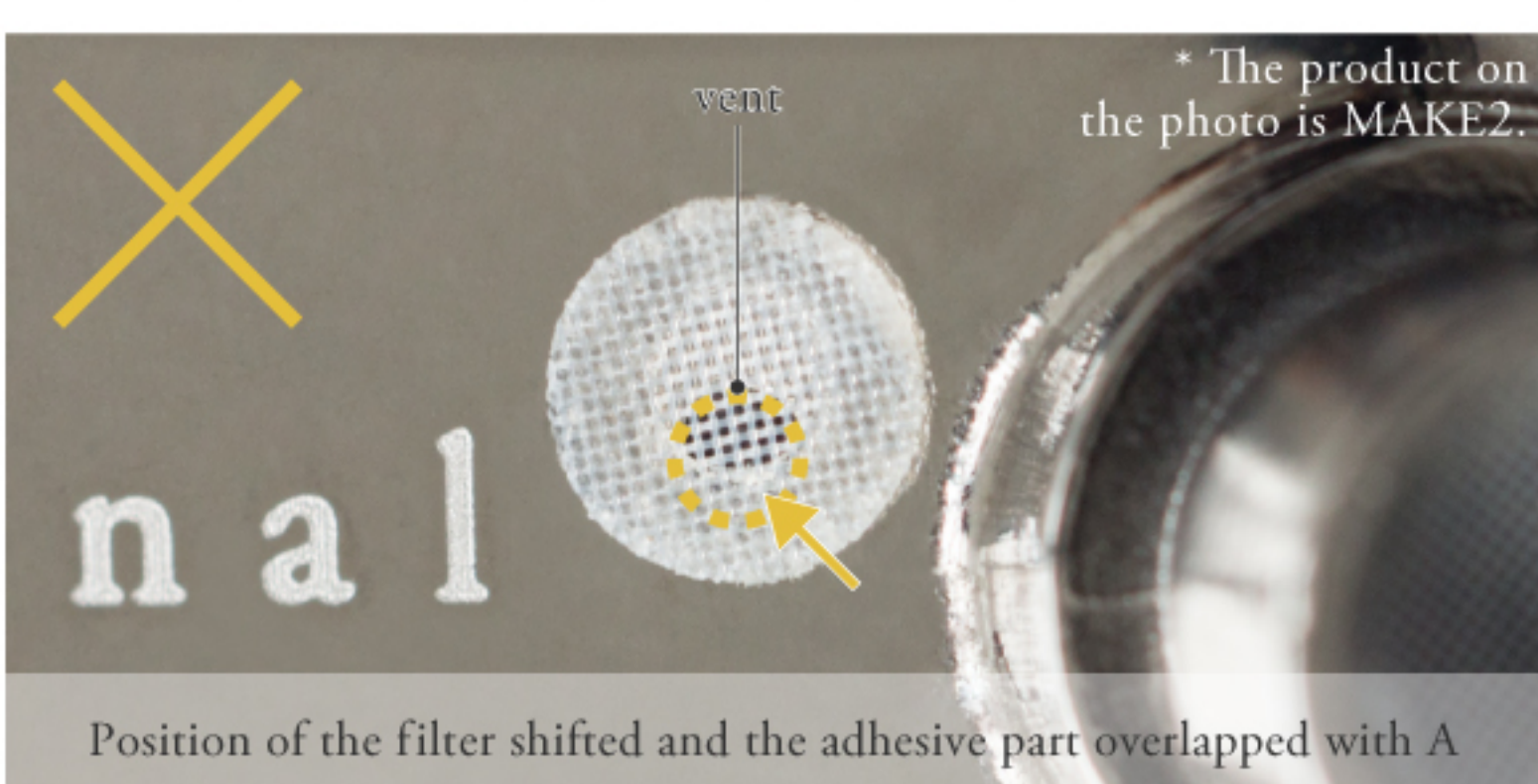
⚠ Point of Caution

✓ Please take care not to scratch the housing with the front end of the tweezers.

✓ Please affix the filter so that the adhesive portion does not cover the vent. Misalignment or loose contact may result in unintentionally tight closure or occurrence of air leakage, either of which may have a serious impact on sound quality.

*Filter C has been created in the same size as the vent.

Users who are unable to skillfully affix Filter C may be able to achieve the same type of effect using Filter A, so please try.



Changing the Cable

■ About Changing the Sound by the Cable

The impact of the physical characteristics of the cable on sound quality have not yet been made clear, but we believe there to be effects of such physical characteristics on high-range sound.

Even in the event that the actual effects of such physical characteristics on sound quality were to be minor, one mysterious and interesting aspect of the audio world is that listeners perceive the feeling of superior sound quality.

■ Example of Changes in Sound character by Changing Cables

Listeners can expect to enjoy changes in sound coloration by replacing the MMCX cable accessory. As one example, replacing the standard MAKE2 cable with the MAKE1 silver coated cable results in a clear overall sound and atmosphere unrelated to changes in the sound frequency characteristics.

Points of Caution

- ✓ Forceful removal and insertion of the connector plug has not been foreseen.

Repeated removal and insertion of the plug may fray or damage the cable, a possible cause of poor connection, so please do not replace the cable with any other cable accessory than those included as an accessory or sold by our company specifically for use with the product.

- ✓ To reduce the risk of damaging the cable, please pull or push the connector plug straight into and out of the cable connector.

- ✓ Don't pull on the cable to remove the plug. Rather, grip the cable plug firmly to pull it from the connector. Additionally, because the chassis is slippery, please use the silicone sheet included as an accessory to grasp the chassis. (The silicon sheet has a protector layer on both sides, so please remove the protective layer before use.)

- ✓ In case the connector becomes scratched or damaged, repair will not be covered free-of-charge under the warranty. The user will bear the full cost of repair or replacement.

Use of Any Material Other Than Filter Accessories as Filter Material

The filter kits are examples of tuning material that have ultimately been conceived with workability in mind. The use of silk and cotton material in tuning, even when used in the same thickness and precision as manufactured products, will result in a different type of sound, and are generally considered to have favorable results.



Points of Caution

- ✓ When using natural fiber material for tuning, please be aware that accumulation of mold or organic degradation of the material risks provocation of allergic reactions, so please use such material at your own risk.