



# Application Note

## AN 03 - Dynamic speakers: design guidelines for sound ports

Frédéric Fallais, Acoustic Application Engineer

2023/03/14

*The information contained herein is for reference purposes only. It is intended as a guide for use by persons having technical skill at their own discretion and risk. We do not assume any liability in connection with its use.*

According to their geometry, enclosure sound ports might dramatically affect the sound quality of a speaker system. This document tries to summarize few of the fundamental aspects to consider when designing acoustical ports.

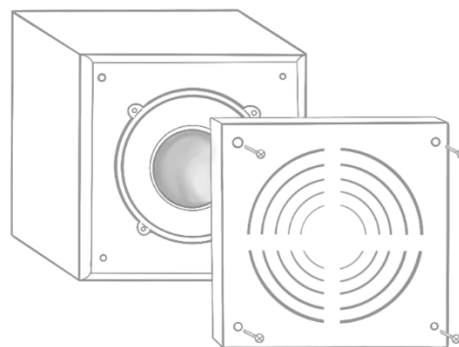


Figure 1 reports a schematic of a conventional speaker module integration into a device. Labels over this figure relate to:

**A**, a front volume of air preferably sized equal in section to that of the diaphragm.

To minimize resonances, we recommend this volume height to be as short as possible, considering the speaker diaphragm excursion (generally 1 or 2mm for micro speakers)

**B**, a gasket ensuring a total sealing of the volume **A**. This element is often made of rubber and surrounds the speaker diaphragm. The gasket must be put in compression either from the front or the rear side of the module.

**C**, perforations pattern (examples of patterns illustrated in Figure 2) satisfying \*% of the speaker diaphragm surface.

\*Micro speaker case: A minimum of 25% is recommended.

\*Large speaker case: A minimum of 50% is recommended.

We recommend the height of the perforations to remain  $< 2 \times$  their diameter / shortest dimension for avoiding additional resonance phenomenon.

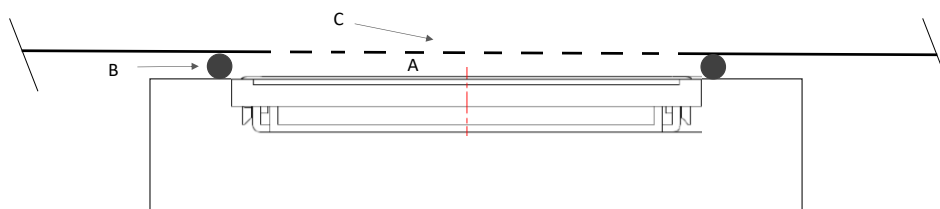
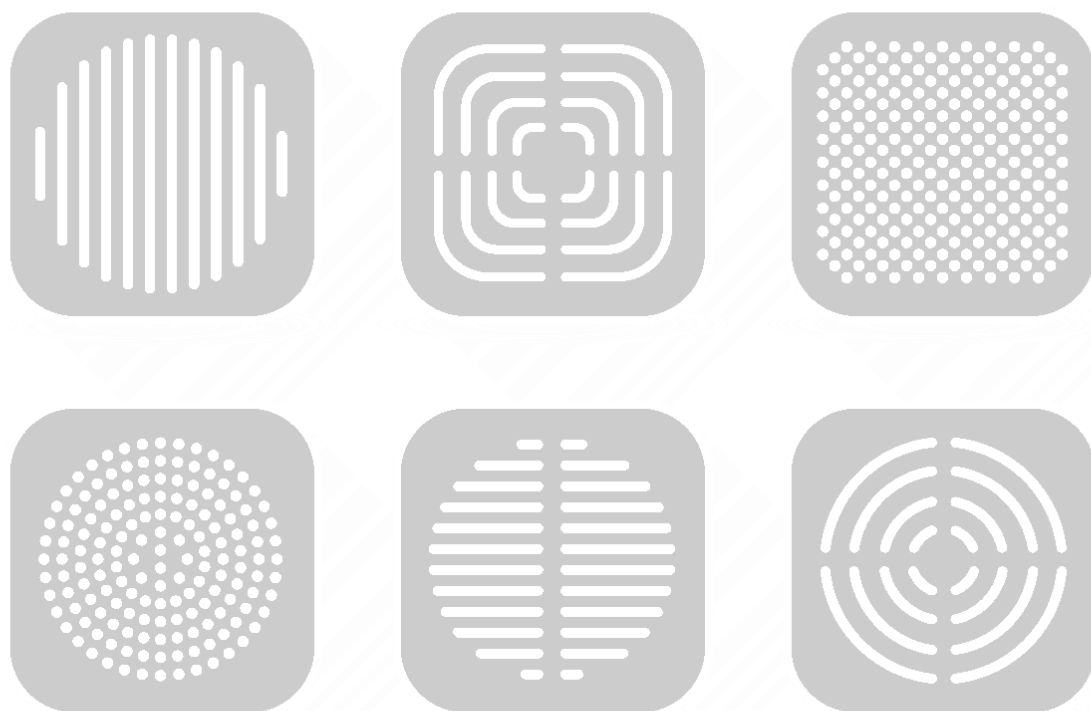


Figure 1 - Speaker module integration into a device – Schematic



*Figure 2 – Example of possible perforations patterns*