GERMANY
VISATON®
The Loudspeaker Specialist

Basics of speaker installation

Acoustic short-circuit

Important points regarding acoustic short-circuit:

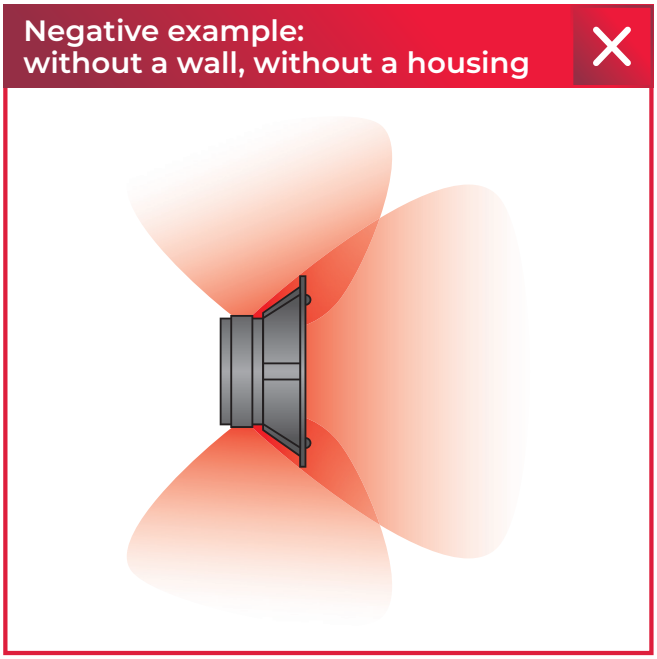
Definition: Cancellation of sound radiated from the front (change in air pressure **in front of** the membrane) and from the rear (change in air pressure **behind** the membrane).

Result: depending on the membrane area, „low“ frequencies may not be reproduced.

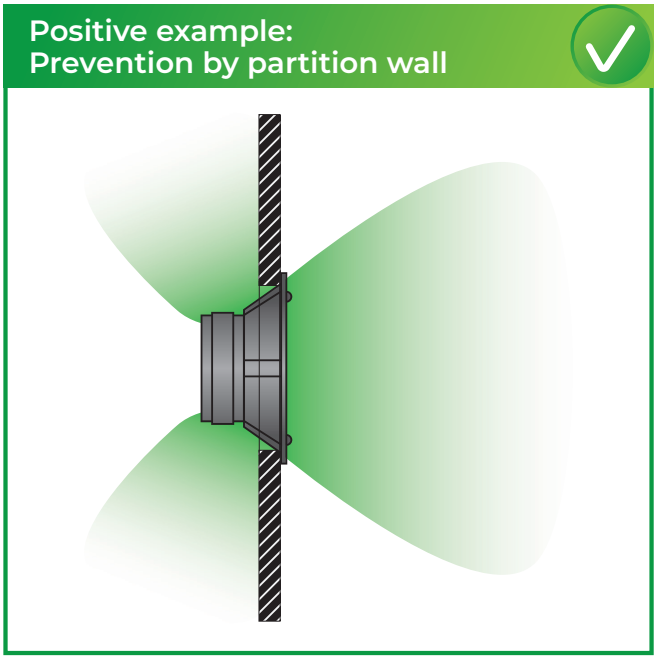
Remedy or possible solution to prevent the acoustic short-circuit:

- Speaker must be flush with baffle
- Partition wall
- Closed housing

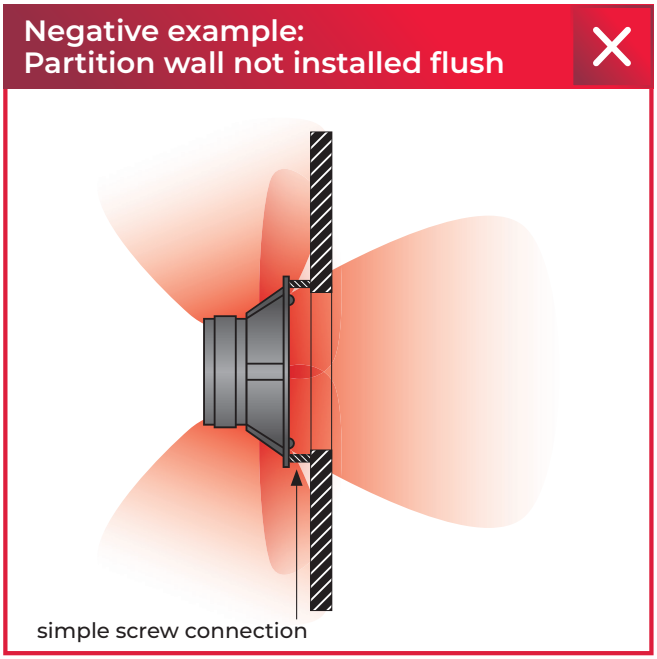
Negative example:
without a wall, without a housing



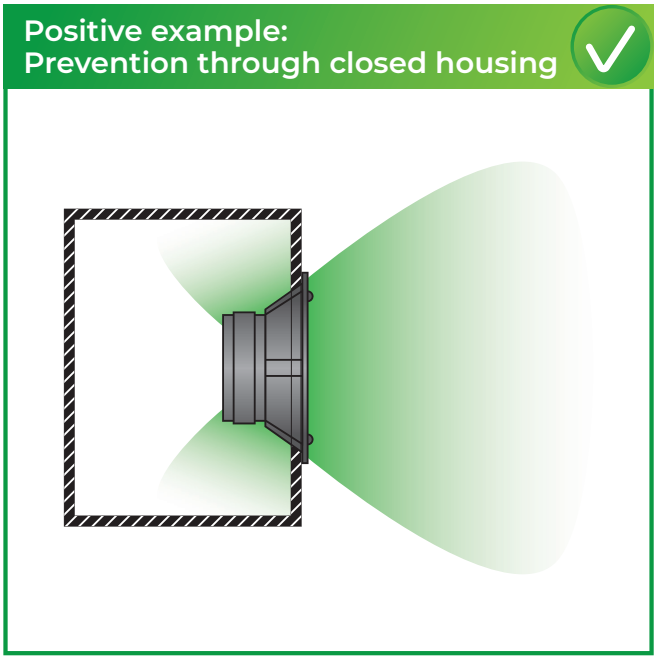
Positive example:
Prevention by partition wall



Negative example:
Partition wall not installed flush



Positive example:
Prevention through closed housing

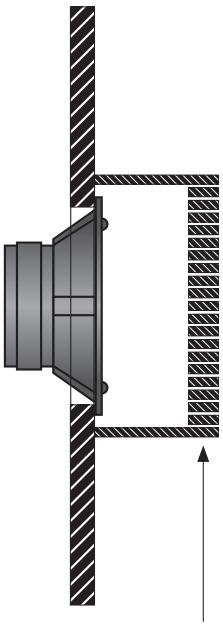


Grille

Important points regarding grille:

- The opening area must be large enough.
- The distance between the grille and the speaker should be as small as possible (but avoid contact during max. membrane excursion).
- The grille must be stable (otherwise, noise will be generated by vibrating grilles).
- The grille material should not be too thick.

Negative example



You can recognise a negative example by this:

- Grille too narrow-meshed
- Distance between grille and speaker too large
  → a pre-chamber in form of a resonator is formed
- Material thickness too large
  → small resonators are formed

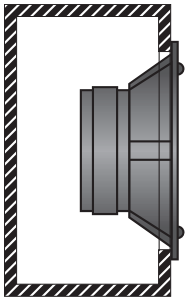
Positive example

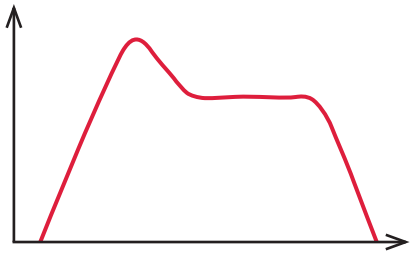
Key points of a positive example:

- Wide-meshed grille
- Very small distance between grille and speaker
  → no formation of a pre-chamber in the form of a resonator
- Material thickness not too large

Volume

Negative example: Volume too small

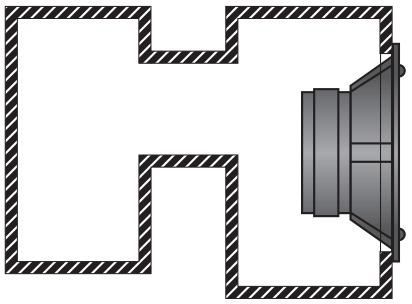




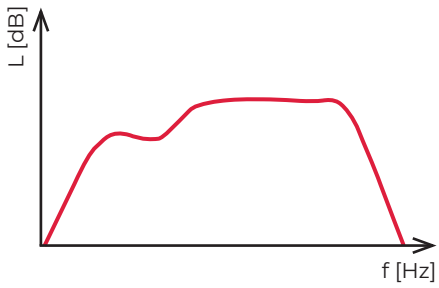
Important points regarding volume:

- The volume must be chosen large enough.
- The calculation is based on the technical parameters of the loudspeaker chassis, known as Thiele/Small Parameters (TSP).
- If the volume is too small, a disturbing resonance develops in the frequency response and low frequencies can no longer be reproduced.
- We are happy to assist you in determining the correct volume size.
- The shape of the volume should be as free from cross-sectional jumps as possible, otherwise a silencer effect will occur (similar to a silencer in a vehicle).

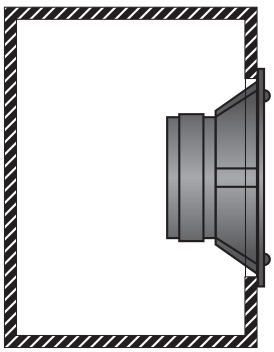
Negative example: Cross-sectional jump in cabinet



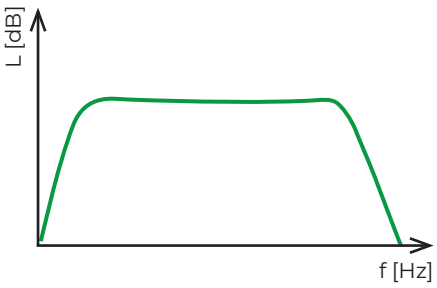
Frequency response:



Positive example: Volume size correct



Frequency response:



f = frequency, L = soundpressurelevel

Standing waves

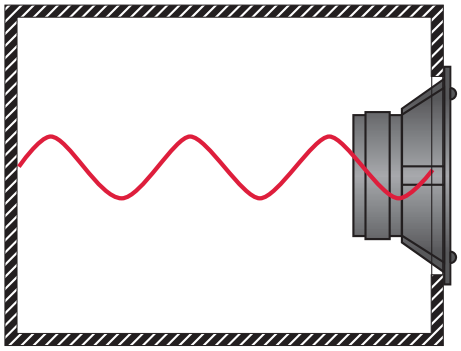
Important points regarding standing waves:

- Standing waves can occur between two walls, which have a negative effect on the acoustic result.

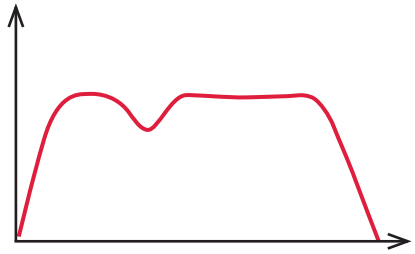
Remedy or possible solution to prevent standing waves:

- Use of damping material or suitably designed housing size – we will be happy to help you with this.

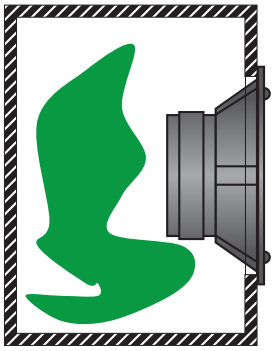
Negative example: Standing wave



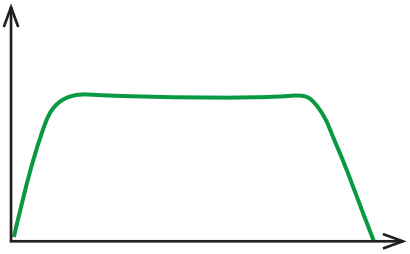
Frequency response:



Positive example: Use of damping material



Frequency response:



f = frequency, L = soundpressurelevel

Bass reflex principle

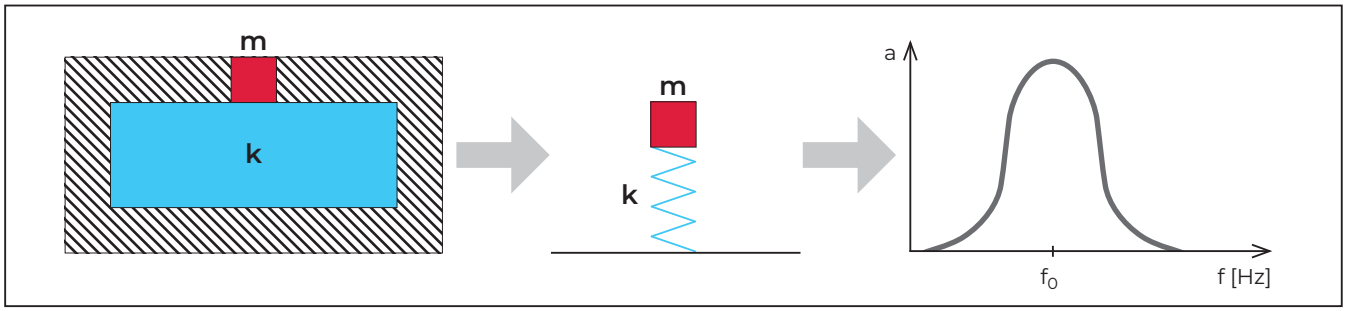
Important points regarding bass reflex principle:

The bass reflex principle works according to the so-called Helmholtz resonator, a mass-spring system. This principle can be easily explained by blowing into the opening of a drink bottle. A sound is produced.

The bass reflex cabinet (ventilated loudspeaker) therefore basically consists of two sources, the loudspeaker chassis and the Helmholtz resonator (bass reflex tube / channel / opening). This principle achieves sound pressure addition in the low-frequency range, depending on the design.

This spring-mass system has a specific resonance frequency depending on the aerial volume in the resonator (m = mass) and the cabinet volume, which acts as a spring (k = spring rate). The excitation is then caused by the sound emitted from the rear of the loudspeaker chassis, which undergoes a phase shift due to the resonator and is thus added to the front sound of the loudspeaker chassis.

The bassreflex principle does not function with every loudspeaker. Besides more cabinet volume is required than with an easy closed box. We are happy to help you with our knowledge regarding this principle.



m = mass, k = spring rate, a = amplitude, f = frequency

Negative effects of the bass reflex principle

- An unintentional resonator in the form of an opening in the cabinet can cause unwanted resonance, which negatively impacts the acoustic performance.

Preventing the bass reflex principle

- A closed cabinet should be built **as tightly as possible.**