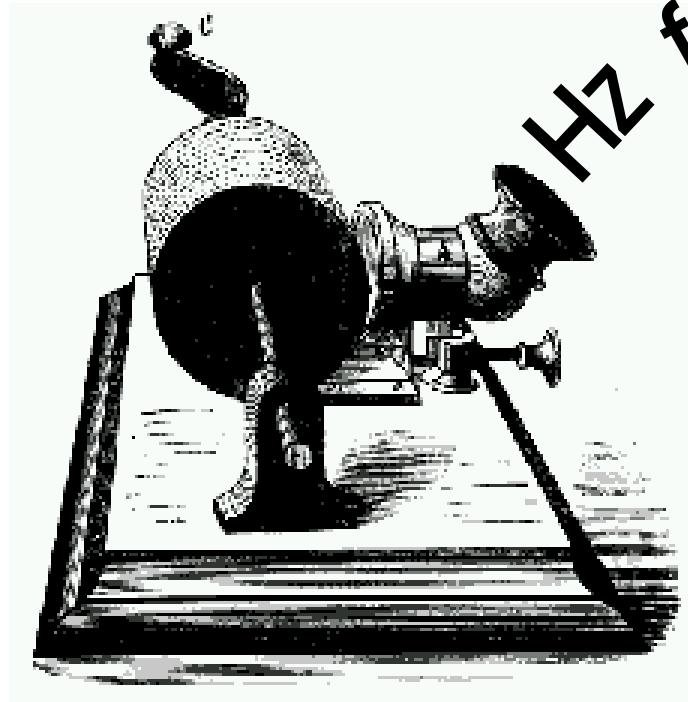
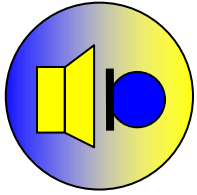


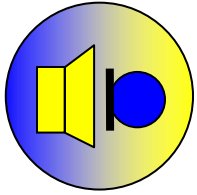
Ljudteknik 5p



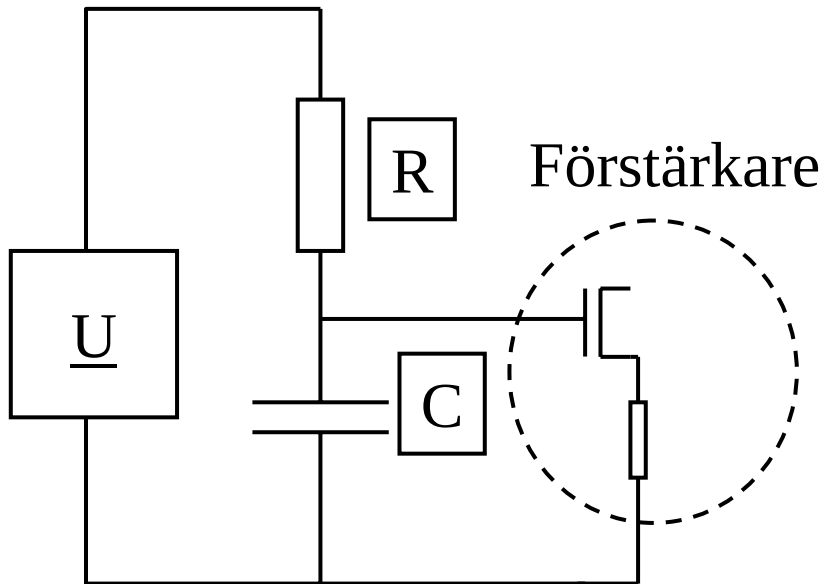
Hz from scratch



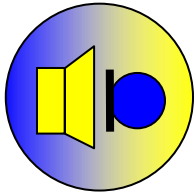
- Innehåll
 - Uppbyggnad av typisk kondensator mikrofon
 - Högtalare



Uppbyggnad av typisk kondensator mikrofon



- Ljudet modulerar kapacitansen
- $C \cdot V = Q$ (laddningen konstant)
- $C \uparrow \quad V \downarrow$



Uppbyggnad av typisk kondensator mikrofon

- Kondensator mikrofon Bruel & Kjaer

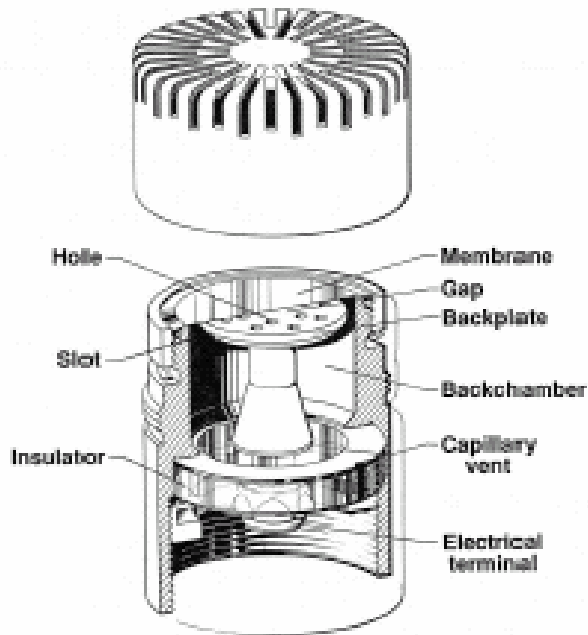
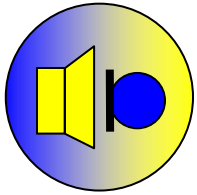
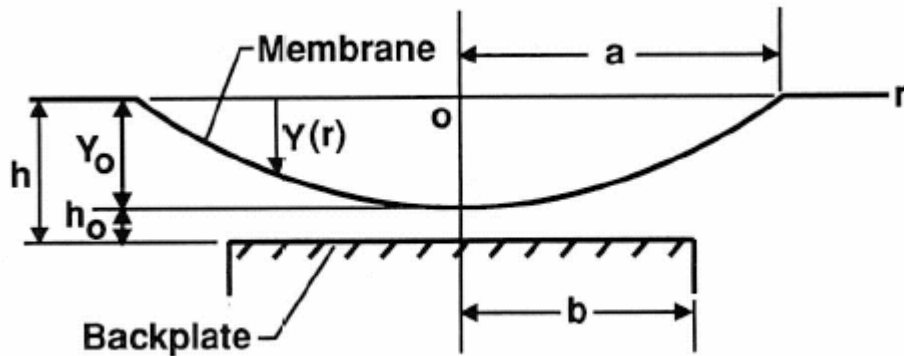


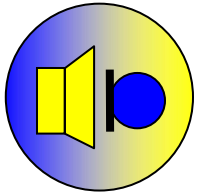
FIGURE 3.1. Cutaway view of a condenser microphone cartridge (Courtesy of B&K Instruments).



Uppbyggnad av typisk kondensator mikrofon

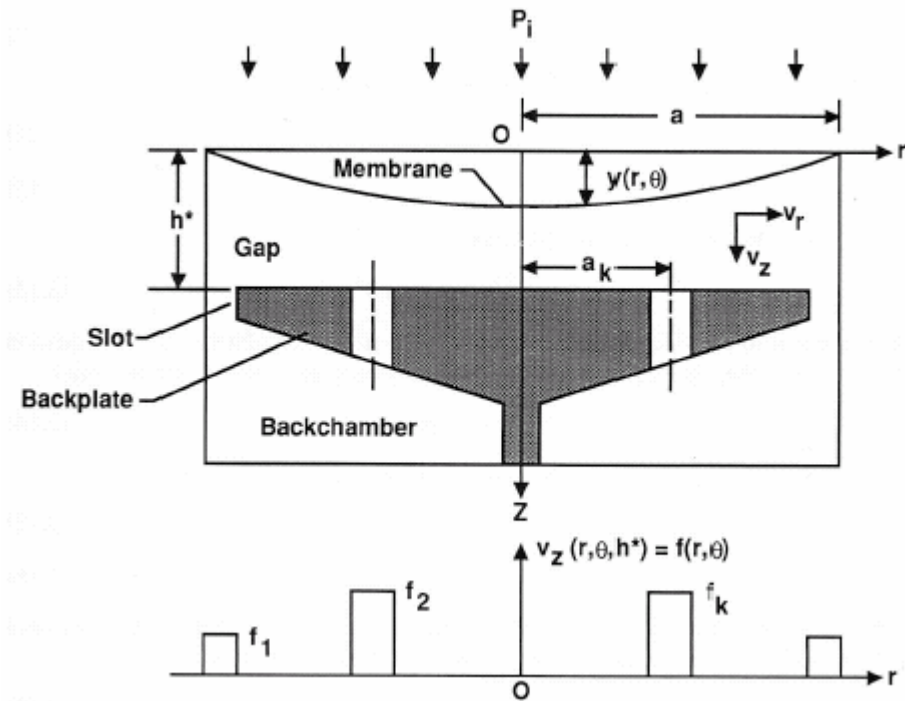


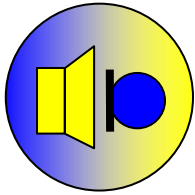
- Spänningen som är pålagd får membranet att bukta inåt, begränsar maximalt pålagd spänning



Uppbyggnad av typisk kondensator mikrofon

- Skiss av mikrofonens uppbyggnad





Uppbyggnad av typisk kondensator mikrofon

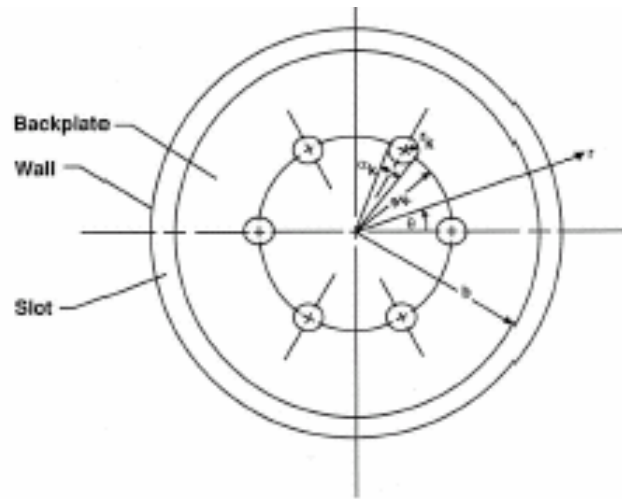
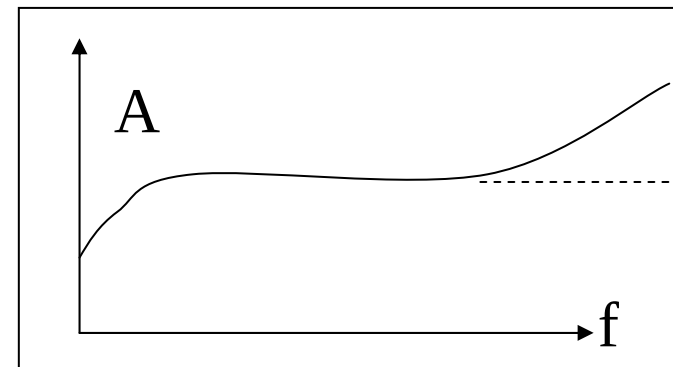
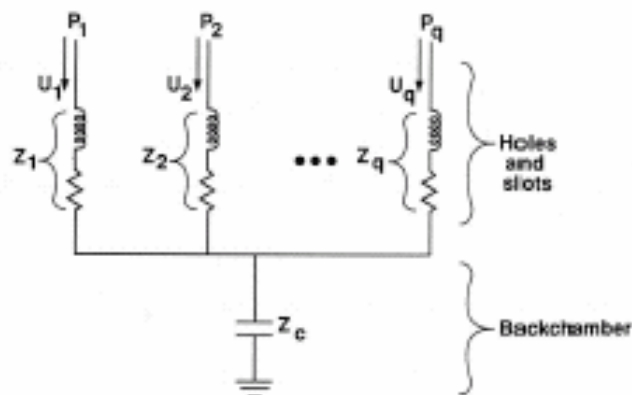
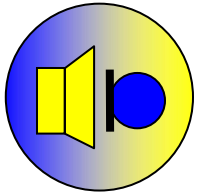


FIGURE 3.5. Typical arrangement of the openings in the backplate.

- För att kunna göra beräkningar på mikrofonen införs elektrisk-mekaniska ekvivalenter, så att rätt antal dämpande kaviteter kan bestämmas (strömningsmotstånd, "stötdämpare")

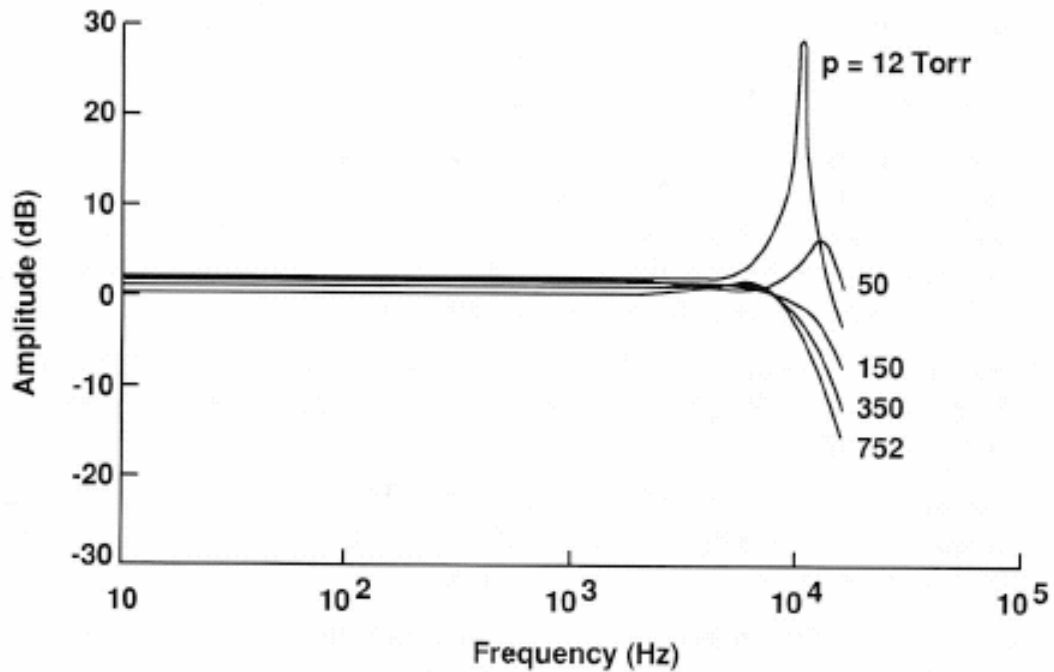


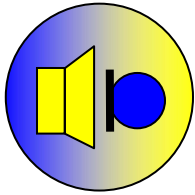
Korrekt dämpning



Uppbyggnad av typisk kondensator mikrofon

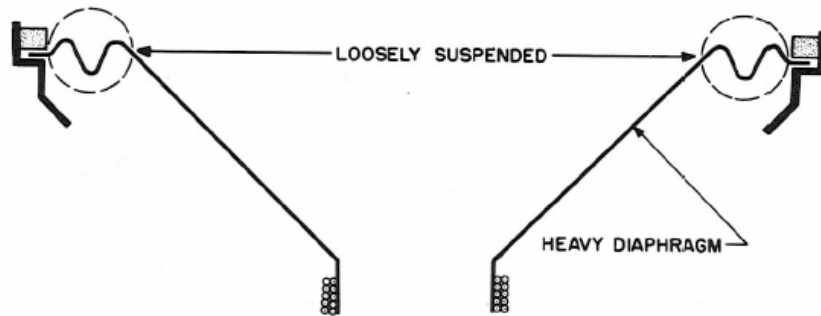
- Lufttrycket påverkar responsen





Högtalare

- Typiskt baselement

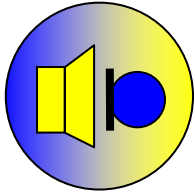


FOR WOOFER:

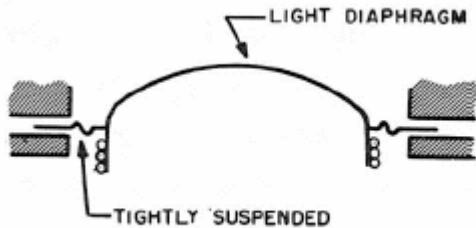
INCREASING DIAPHRAGM WEIGHT LOWERS RESONANCE

LOOSENING OF SUSPENSION LOWERS RESONANCE

INCREASING DIAPHRAM AREA IMPROVES LOWS

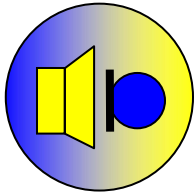


Högtalare



- Typisk diskanthögtalare

FOR TWEETER:
DECREASING DIAPHRAGM WEIGHT RAISES RESONANCE
TIGHTENING OF SUSPENSION RAISES RESONANCE

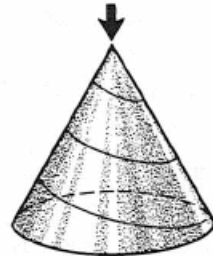


Högtalare

- Högtalaren skall fungera som en styv kolv



A FLAT PIECE OF PAPER SUPPORTED AT ITS EDGES WILL READILY SAG AND DISTORT UNDER PRESSURE APPLIED TO ITS CENTER



THE SAME PIECE OF PAPER ROLLED UP INTO THE SHAPE OF A CONE WILL EXHIBIT GREAT STRENGTH WHEN A FORCE IS APPLIED TO ITS APEX

A SHALLOW DIAPHRAGM WILL BE UNSTABLE FOR LARGE APPLIED VIBRATIONS



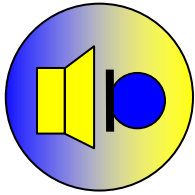
WHERE PISTON ACTION IS DESIRED

A DEEP CONE WILL BE MECHANICALLY STABLE FOR LARGE APPLIED MOTIONS

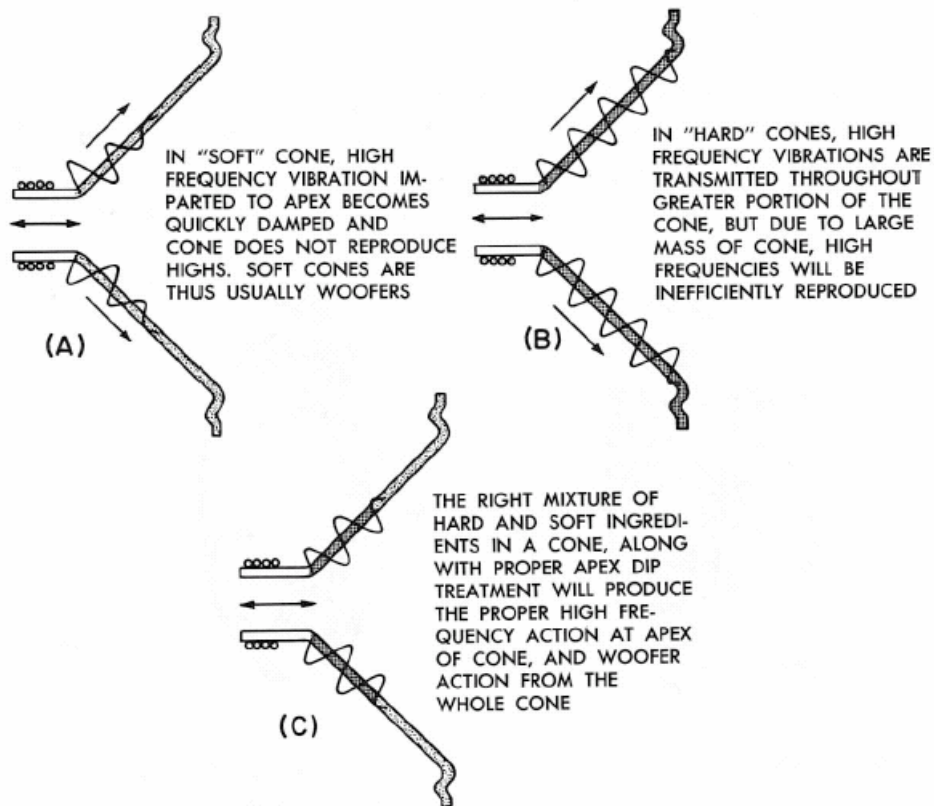


WHERE PISTON ACTION IS DESIRED

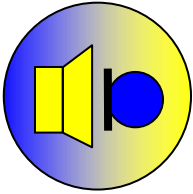
Fig. 4-1. Where complete piston motion of a diaphragm is required, maximum mechanical stability may be obtained by a deep conical structure.



Högtalare

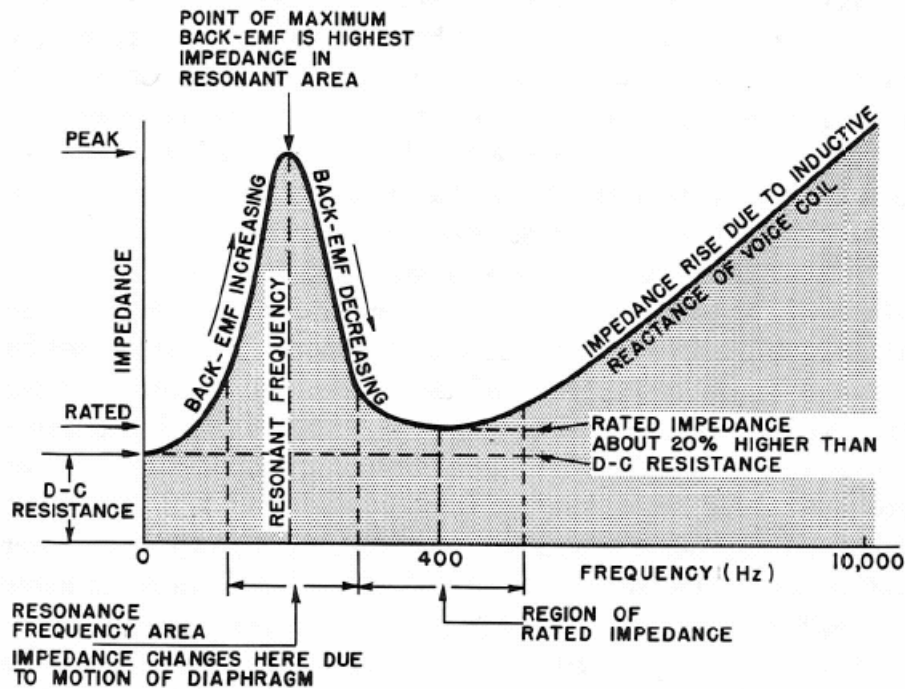


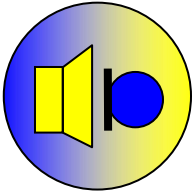
- Membranets uppbyggnad påverkar högtalarens egenskaper



högtalare

- Högtalaren har en komplex impedanskurva med en resonans topp





Högtalare

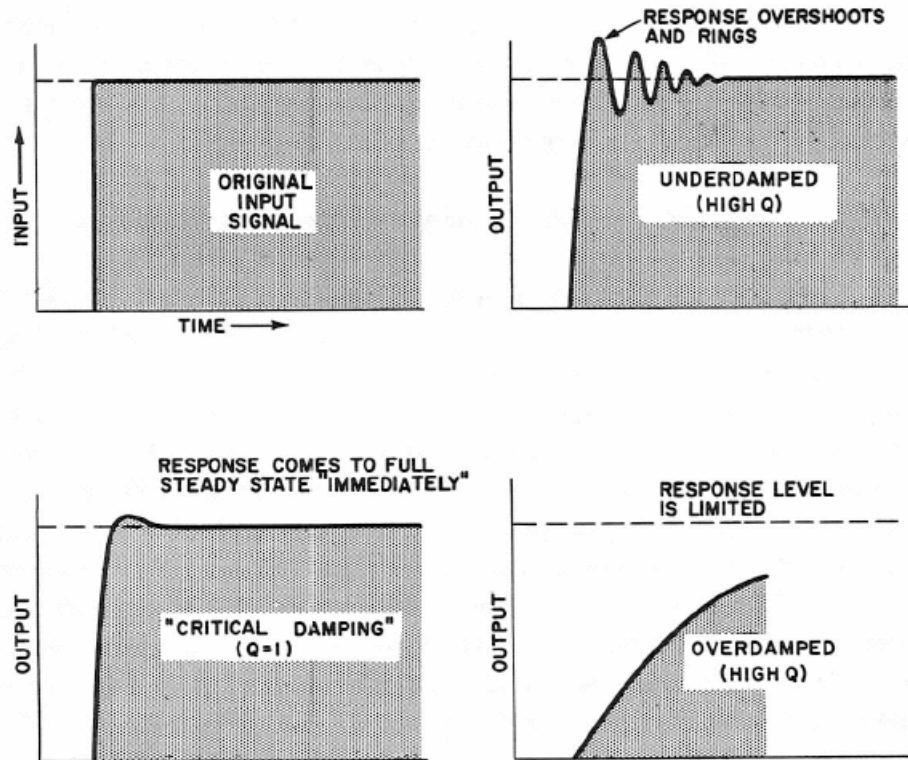
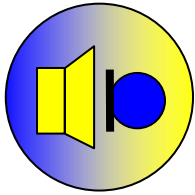
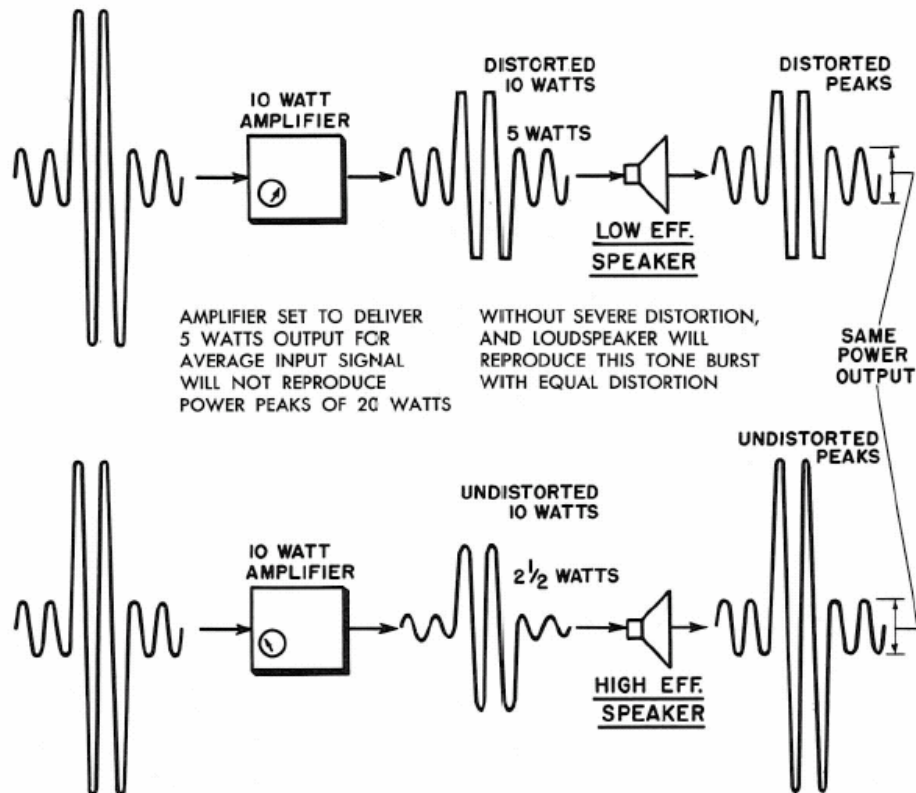


Fig. 5-4. Proper damping will make the loudspeaker respond to a signal without excessive overshoot, and without loss of output.

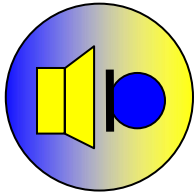
- Högtalaren måste arbeta med lagom dämpning för att frekvensområde och transientåtergivning skall bli optimal



Högtalare

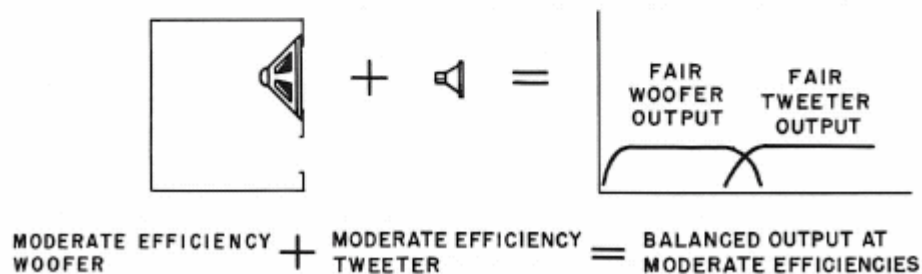
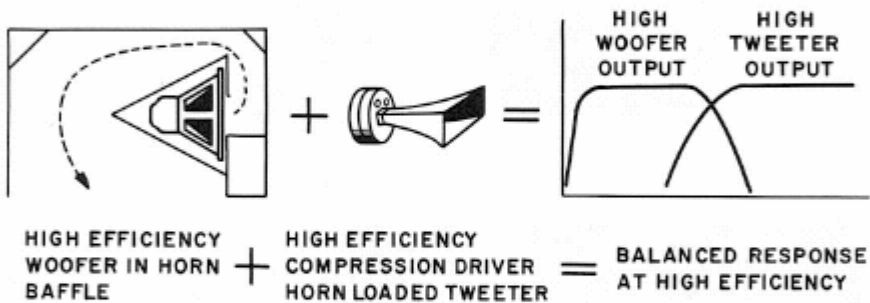
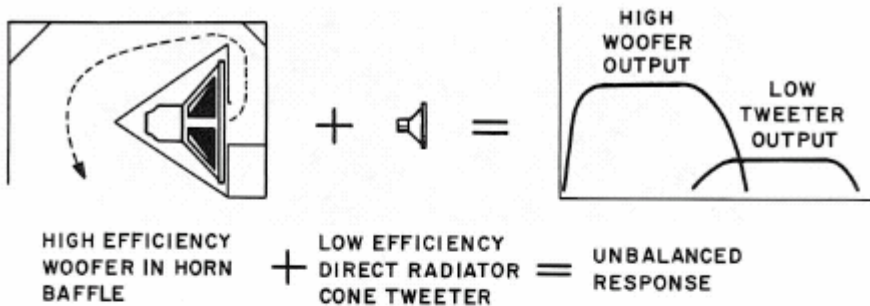


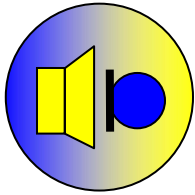
- Dålig verkningsgrad hos högtalaren medför att förstärkaren klipper



Högtalare

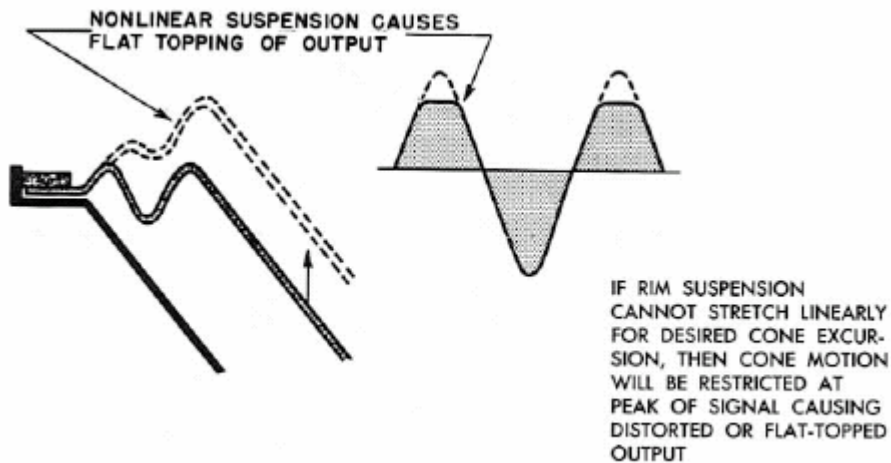
- Hänsyn till olika högtalares verkningsgrad i sammansatta system

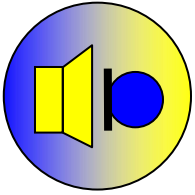




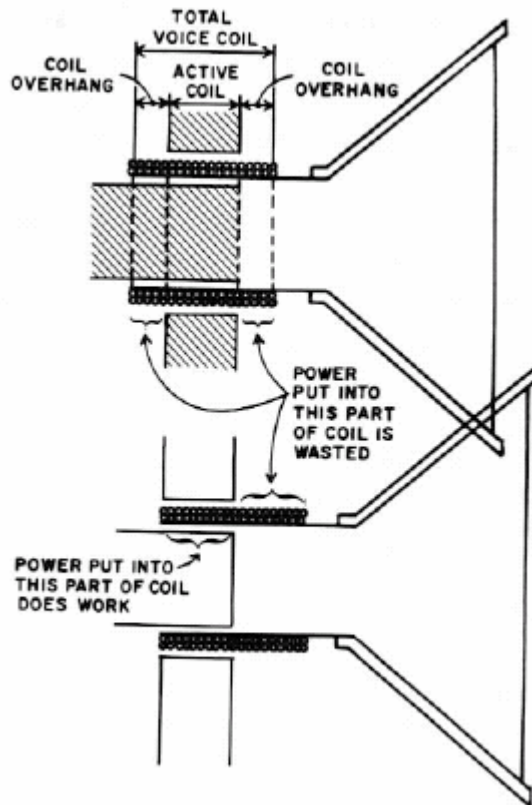
Högtalare

- Högtalarens utslag måste vara linjärt till pålagd signal

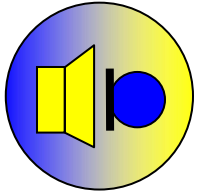




Högtalare

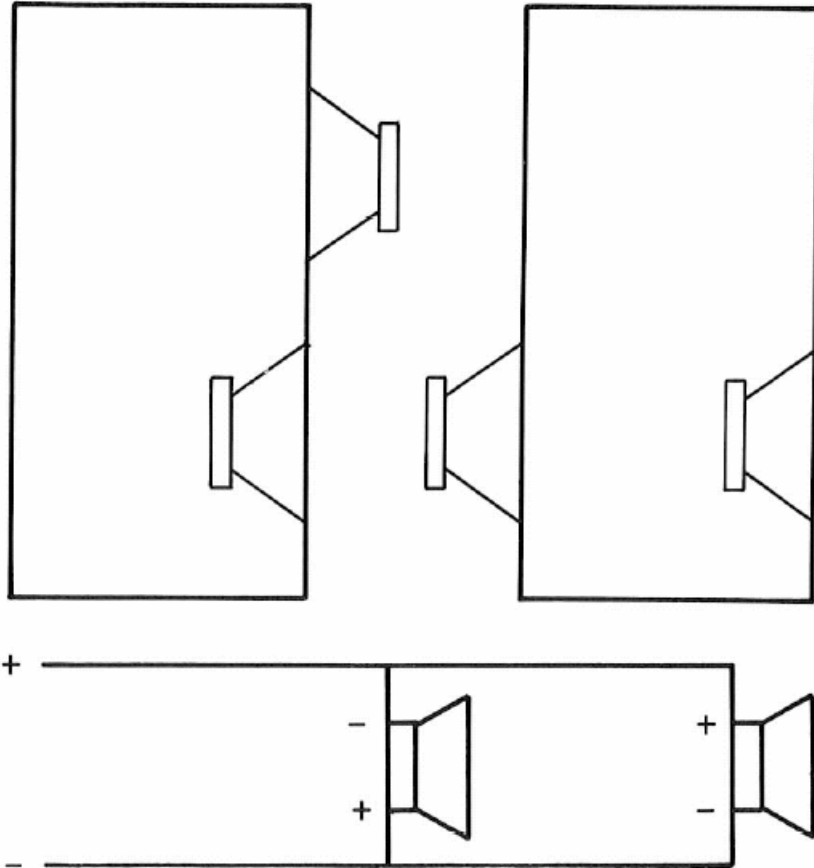


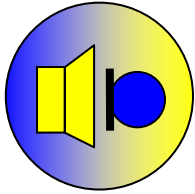
- Lika stor del av spolen måste vara i magnetgapet under hela rörelsen för låg distorsion
- Detta ger lägre verkningsgrad hos elementet



Högtalare

- Mottakt kopplade element minskar distorsionen på grund av brister upphängning





Högtalare

- Ger dubbelt så hög konmassa per ytenhet vilket förbättrar basåtergivningen, mottaktkoppling minskar distorsionen

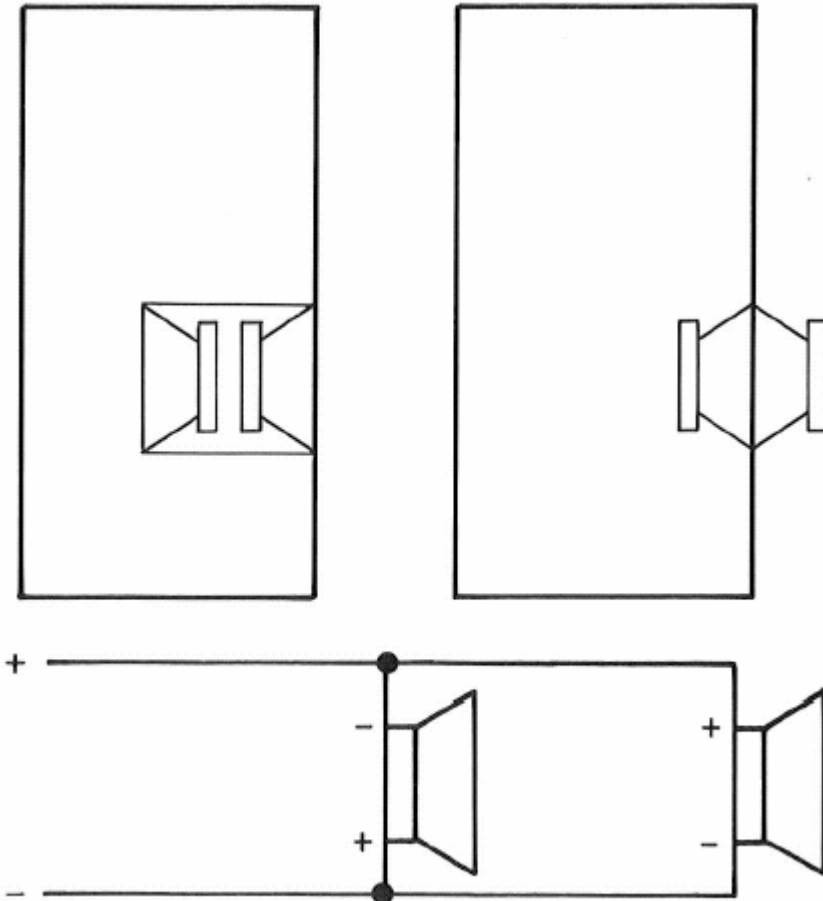
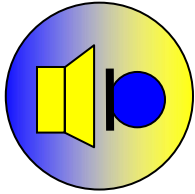


FIGURE 1.4: Compound woofer mounting.



Högtalare

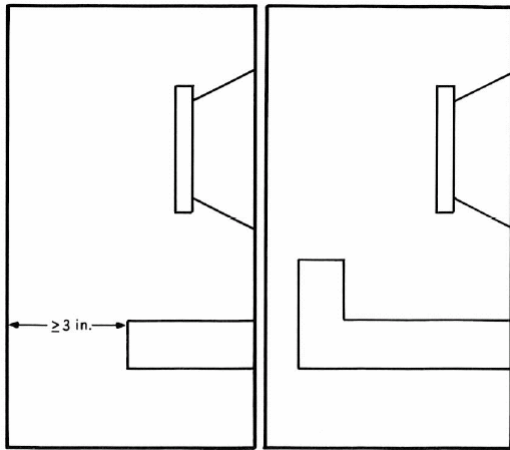
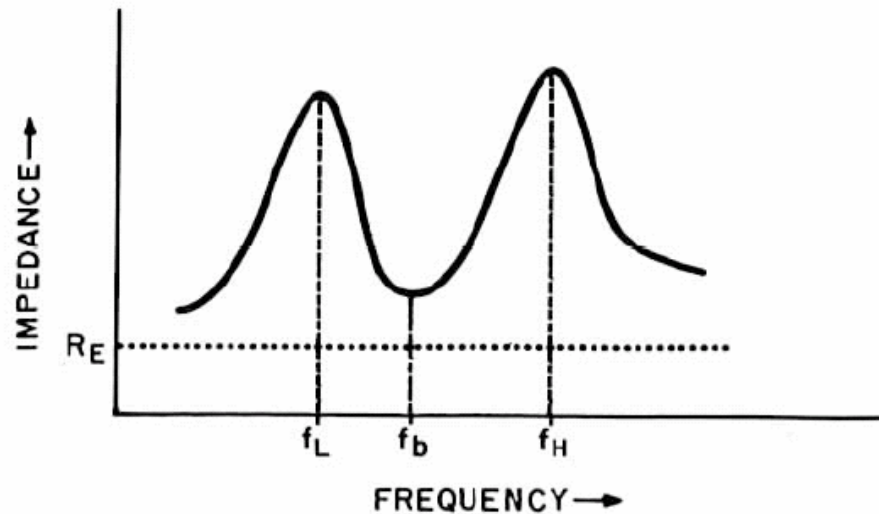
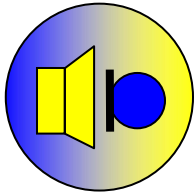


FIGURE 2.3: Vent configuration.



- Basreflex förbättrar basåtergivning, Impedanskurvan får två toppar



Högtalare

- Hornhögtalare ger hög verkningsgrad pga impedanstransformering

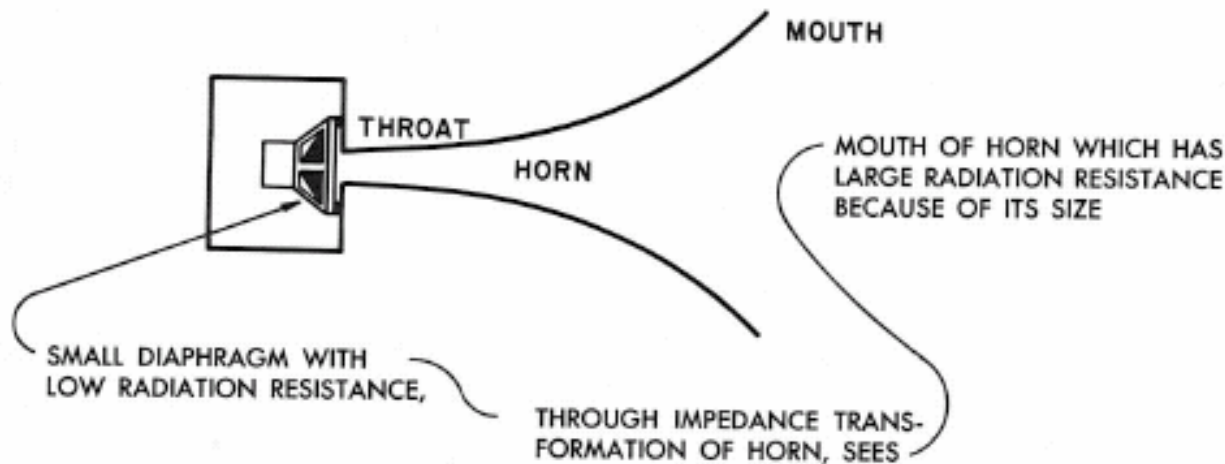


Fig. 11-3. Small diaphragm is better match to "all the air" through the horn as an impedance transformer.