

Notes:

The supraBaffle serves a specific purpose. Any speaker mounted on a baffle will see 2π steri-radians at high frequencies & 4π steri-radians at low frequencies. Ignoring any other influences this means an on-axis drop in level of 6 dB in the low frequencies. This is called baffle step loss*. With the narrow baffle of the Frugel-Horn this would start ~ 650-700 Hz. The output from the horn is high enough to compensate but only up to 250-300 Hz. The purpose of the supraBaffle is to push the baffle-step down in frequency until it meets up with the output from the horn. This depends on compression chamber size (ie the acoustic XO between the horn & the direct driver radiation), Exact values await actual measurements of units in the field.

*(for more info <http://www.t-linespeakers.org/tech/bafflestep/intro-bds.html>)

A 1st order approximation is that the supraBaffle needs to have an average minimum dimension of $11\ 1/2'$ -- $13"$ (292-330mm). The actual shape leaves a lot of room for creativity.

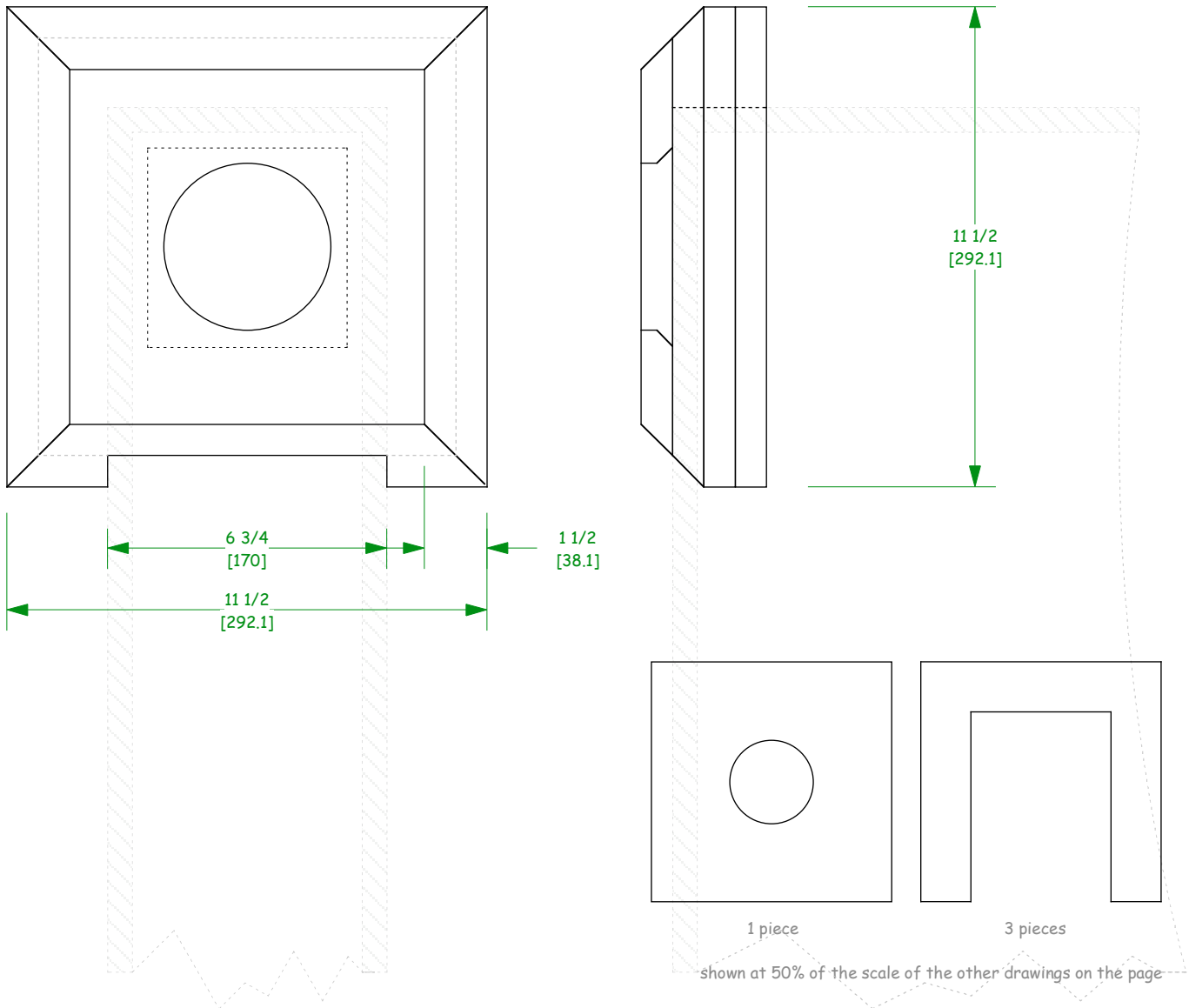
On the next sheet i have reproduced Page 23 of Olson's Acoustics and some shapes suggested or implemented already. This graphically illustrates the diffraction behaviour of a number of standard shapes. One can see that a sphere is smoothest, a truncated pyramid is close, and that any shape requires a trailing edge. From this, and ease of construction, a truncated pyramid will be designated as "the standard supraBaffle".

Considering work done since Olson, the shape that B&W uses on their top-of-range speakers for their midrange probably represents a close to ideal shape.

The supraBaffle can be flush with the front baffle, stand completely proud, or somewhere in-between. The standard sB will fit over the front, with most of the sB behind the plane of the front -- this because it is easiest to execute. Keep in mind that a supraBaffle proud of the front is going to increase the size of the suprabaffle.

This "standard supraBaffle" is comprised of 4 layers of $\sim 3/4"$ (19mm) material, and then passed thru a table saw with the blade set at 45° to achieve the bevel.

The Frugel-Horn
Open Source Corner Horn
Project V1.0 sheet 11
supraBaffles
drawn by dld
04-october-2006



The most thumbed page in my copy of Olson's Acoustics -- everybody should have a copy of this book (available from audioXpress).

It shows the baffle step diffraction on various shape baffles. It can be very helpful deciding what not to do.

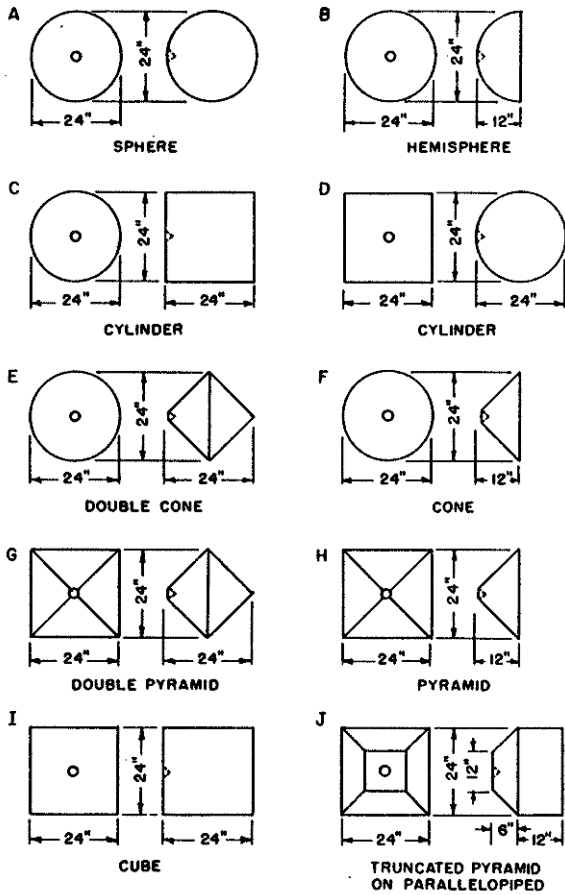


FIG. 1.9. Structures used in sound diffraction studies.

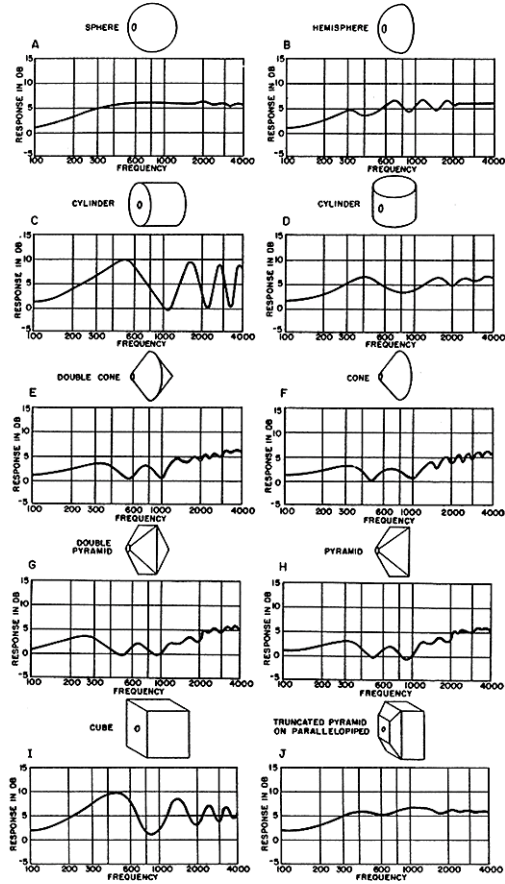
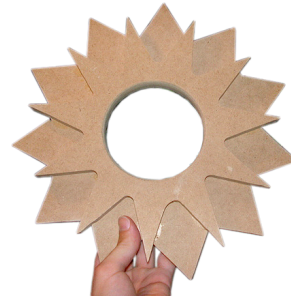
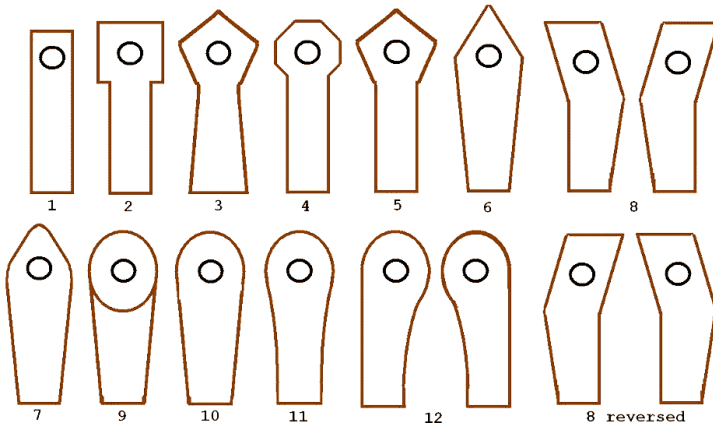


FIG. 1.10. Response frequency characteristics depicting the diffraction of sound by ten objects of different shapes. The dimensions of the objects are given in Fig. 1.9.

John in Costa Rica provided these sketches of possible supraBaffle shapes.



Josh's star shaped supraBaffle & the Nautalus midrange pod